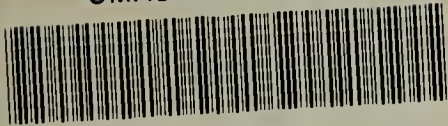


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1992

AIR QUALITY REPORT
COMMONWEALTH OF MASSACHUSETTS



EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY CONTROL

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AIR QUALITY SURVEILLANCE BRANCH

37 Shattuck Street

Lawrence, Massachusetts 01843

1992
AIR QUALITY REPORT

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SECTION 1

AMBIENT AIR CRITERIA POLLUTANT MONITORING

1. INTRODUCTION

This report presents 1992 annual air quality information for Massachusetts. Ambient air quality data is collected by the Air Quality Surveillance Branch (AQSB), Division of Air Quality Control (DAQC), Department of Environmental Protection (DEP). The collected data is submitted into the Aerometric Information Retrieval System (AIRS), a computer-based repository of air quality information which is administered by the U.S. Environmental Protection Agency (EPA).

The ambient air quality data is used to verify compliance with state and national ambient air quality standards (see Table 2), to support development of regulations designed to reduce ambient air pollution, to assess the effectiveness of existing air pollution control strategies, to provide aerometric data for special research and to fulfill EPA reporting requirements for ambient air quality data.

The AQSB is responsible (in accordance with the Code of Federal Regulations - 40 CFR Part 58) for monitoring ambient air quality for six criteria pollutants: sulfur dioxide (SO₂), ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂), lead (Pb) and particulate matter less than or equal to 10 microns (PM₁₀). Nitrogen oxide (NO) is monitored in conjunction with NO₂ but it is not a criteria pollutant. In addition, total suspended particulates (TSP), which was the ambient particulate standard prior to July 31,

1987, is monitored. Table 3 provides a summary of the sources of the criteria pollutants and their health effects.

During 1992 the AQSB maintained a public ambient air monitoring network of 38 stations located throughout the Commonwealth. The stations are equipped with various types of monitors which measure for different pollutants. Continuous monitors measure for SO₂, CO, O₃ and NO₂/NO. At some stations meteorological parameters [including wind speed/wind direction (WS/WD), relative humidity (RH), barometric pressure (BP), temperature (TEMP) and solar radiation] are monitored on a continuous basis as well. The data from the continuous monitors are averaged to provide hourly concentrations. Non-continuous monitors measure PM₁₀, Pb, TSP and radiation at an every 6th day frequency taking samples for 24 hours. Table 4 lists the public air monitoring network. Table 5 lists the site directory of the public air monitoring network.

During 1992 the AQSB also oversaw an industrial ambient air monitoring network comprised of 30 air monitoring stations. The industrial network is comprised of continuous monitors for SO₂, NO₂/NO, WS/WD, PM₁₀ and temperature, and, non-continuous monitors for TSP and sulfates (SO₄). Table 6 lists the industrial air monitoring network description. Table 7 lists the site directory of the industrial ambient air monitoring network.

The data from the public and industrial ambient air quality networks has been summarized in this report for public record and information. For further information pertaining to this report contact the Air Quality Surveillance Branch at the address listed on the following

page. For information pertaining to other air quality matters, please contact DEP at the Division of Air Quality Control in Boston or the Regional Offices. The offices are listed below in Table 1.

TABLE 1: DEPARTMENT OF ENVIRONMENTAL PROTECTION OFFICES

<p><u>REGION 1 (WESTERN)</u> State House West 436 Dwight St., 4th Floor Springfield, MA 01103 (413) 784-1100</p> <p>John Higgins: Regional Director</p> <p>David Howland: Regional Environmental Engineer (Bureau of Waste Prevention)</p> <p>Craig Goff: Section Chief - Air Quality</p>	<p><u>REGION 2 (CENTRAL)</u> 75 Grove St. Worcester, MA 01605 (617) 792-7650</p> <p>Cornelius J. O'Leary: Regional Director</p> <p>Michael Maher: Regional Environmental Engineer (Bureau of Waste Prevention)</p> <p>Thomas Cusson: Section Chief - Air Quality</p>
<p><u>REGION 3 (NORTHEAST/MET-BOSTON)</u> 10 Commerce Way Woburn, MA 01801 (617) 935-2164</p> <p>William Gaughan: Acting Regional Director</p> <p>Edward Macdonald: Regional Environmental Engineer (Bureau of Waste Prevention)</p> <p>James Belsky: Section Chief - Air Quality</p>	<p><u>REGION 4 (SOUTHEAST)</u> Lakeville State Hospital Lakeville, MA 02346 (508) 946-2700</p> <p>George Crombie: Regional Director</p> <p>Chris Tilden: Regional Environmental Engineer (Bureau of Waste Prevention)</p> <p>John Winkler: Acting Section Chief - Air Quality</p>
<p><u>DIVISION OF AIR QUALITY CONTROL</u> 1 Winter St. Boston, MA 02108 (617) 292-5630</p> <p>Barbara Kwetz: Director</p>	<p><u>AIR QUALITY SURVEILLANCE BRANCH</u> Lawrence Experiment Station 37 Shattuck St. Lawrence, MA 01843 (508) 975-1138</p> <p>Donald Steele: Branch Chief</p>

TABLE 2: STATE AND NATIONAL AMBIENT AIR QUALITY STANDARDS

POLLUTANT	AVERAGING TIME	PRIMARY STANDARD	SECONDARY STANDARD
SO ₂	Annual Arithmetic Mean	80 $\mu\text{g}/\text{m}^3$ (0.03 ppm)	----
	24 Hours		----
		365 $\mu\text{g}/\text{m}^3$ (0.14 ppm)	----
	3 Hours	----	1300 $\mu\text{g}/\text{m}^3$ (0.50 ppm)
CO	8 Hours	9 ppm (10 $\mu\text{g}/\text{m}^3$)	Same as the Primary Standard
	1 Hour	35 ppm (40 $\mu\text{g}/\text{m}^3$)	Same as the Primary Standard
O ₃	* 1 Hour	0.12 ppm (235 $\mu\text{g}/\text{m}^3$)	Same as the Primary Standard
NO ₂	Annual Arithmetic Mean	0.05 ppm (100 $\mu\text{g}/\text{m}^3$)	Same as the Primary Standard
PM ₁₀ ¹	Annual Arithmetic Mean	50 $\mu\text{g}/\text{m}^3$	Same as the Primary Standard
	* 24 Hours	150 $\mu\text{g}/\text{m}^3$	Same as the Primary Standard
PB	Calender Quarter Arithmetic Mean	1.5 $\mu\text{g}/\text{m}^3$	Same as the Primary Standard

Standards other than those based upon the annual arithmetic mean are not to be exceeded more than once a year.

Primary Standard: The level of air quality necessary, with an adequate margin of safety, to protect the public health.

Secondary Standard: The level of air quality necessary to protect the public welfare from the adverse effects of a pollutant.

* Standard is based upon an estimated exceedance calculation. Estimated exceedances should not exceed 1.0 per year.

$\mu\text{g}/\text{m}^3$ = micrograms per cubic meter; ppm = parts per million

¹ PM₁₀ replaced TSP as the ambient particulate standard effective July 31, 1987. It encompasses only those particulates with an aerodynamic diameter less than or equal to 10 microns.

TABLE 3: POLLUTANTS - THEIR SOURCES AND EFFECTS

POLLUTANTS AND THEIR SOURCES	HEALTH AND WELFARE EFFECTS
<p><u>OZONE (O3)</u> Product of reactions of motor vehicle exhaust, industrial process emissions and fossil fuel combustion emissions in the presence of sunlight.</p>	<p><u>HEALTH</u> Breathing difficulty when exercising; irritates eyes; respiratory infections. Acute exposures cause bronchial constriction, lung edema and abnormal lung development.</p> <p><u>WELFARE</u> Toxic to plants causing leaf damage and decrease in growth. Weakens materials such as rubber and fabrics.</p>
<p><u>CARBON MONOXIDE (CO)</u> Internal combustion engines, fossil fuel combustion and cigarette smoking.</p>	<p><u>HEALTH</u> Reduces the blood's ability to carry oxygen which may cause heart and brain damage.</p> <p><u>WELFARE</u> No known effect on materials or vegetation.</p>
<p><u>SULFUR DIOXIDE (SO2)</u> Fossil fuel combustion emissions.</p>	<p><u>HEALTH</u> Irritation of throat and lungs. Aggravation of symptoms associated with chronic lung disease such as asthma and bronchitis.</p> <p><u>WELFARE</u> Causes corrosion of metals, discoloration of paint, deterioration of fabrics and leaf damage to some plants.</p>
<p><u>NITROGEN DIOXIDE (NO2)</u> Emitted from motor vehicles and fossil fuel burning operations.</p>	<p><u>HEALTH</u> Aggravation of symptoms associated with asthma and bronchitis. Increased susceptibility to respiratory infections.</p> <p><u>WELFARE</u> Fading of dyes, yellowing of leaves, causes reddish brown haze in the atmosphere.</p>
<p><u>PARTICULATES (PM10 + TSP)</u> Fossil fuel combustion emissions, industrial process emissions, motor vehicle exhaust and traffic movement over dusty roads.</p>	<p><u>HEALTH</u> Aggravation of symptoms associated with chronic lung diseases. Alters lung's natural cleansing mechanism.</p> <p><u>WELFARE</u> Causes soiling and corrosion to materials; atmospheric haze.</p>
<p><u>SULFATE (SO4)</u> Is the principal oxidation product of sulfur dioxide released into the atmosphere.</p>	<p><u>HEALTH</u> Increases the respiratory toxicity of other air pollutants. Exacerbates respiratory diseases such as asthma and bronchitis.</p> <p><u>WELFARE</u> Causes corrosion to materials; atmospheric haze.</p>
<p><u>LEAD (PB)</u> Motor vehicle exhaust and smelter emissions.</p>	<p><u>HEALTH</u> Mental retardation, brain and other organ damage.</p> <p><u>WELFARE</u> No direct impact on vegetation.</p>

TABLE 4: 1992 PUBLIC NETWORK DESCRIPTION

<u>NUMBER OF MONITORING STATIONS</u>	38
<u>NUMBER OF CITIES WITH MONITORING STATIONS</u>	23
<u>CONTINUOUS CRITERIA POLLUTANT (CO,NO2,O3,SO2) MONITORS</u>	42
9 CO (Carbon Monoxide)	
6 NO2 (Nitrogen Dioxide)	
16 O3 (Ozone)	
11 SO2 (Sulfur Dioxide)	
<u>NONCONTINUOUS CRITERIA POLLUTANT (PM10,Pb) MONITORS</u>	27
21 PM10 (Particulate Matter-10 microns).	
Three stations have collocated ¹ monitors. Quabbin has 2 monitors for every third day sampling.	
6 Pb (Lead). Two stations have collocated ¹ monitors.	
<u>METEOROLOGICAL MONITORS</u>	32
3 SOLAR RAD (Solar Radiation)	
1 BP (Barometric Pressure)	
2 RH (Relative Humidity)	
6 TEMP (Temperature)	
10 WD (Wind Direction)	
10 WS (Wind Speed)	
<u>OTHER MONITORS</u>	26
8 TSP (Total Suspended Particulates). Two stations have collocated ¹ monitors.	
17 RAD (Radiation). The first PM10 filter each month is analyzed for radiation.	
1 IMPROVE ² . The filter from this monitor is sent to sent to U-Cal (Davis) for analysis.	
1 ACID RAIN. This is a wet/dry deposition sampler.	

¹ Monitors are collocated (2 monitors at a station which run simultaneously) in order to assess precision.

² Interagency Monitoring of Protected Visual Environments

TABLE 5: PUBLIC SITE DIRECTORY

CITY SITE LOCATION	AIRS CODE	PARAMETERS MONITORED
<u>ADAMS</u> Mt. Greylock Summit	25-003-4002	O3
<u>AGAWAM</u> 152 Westfield St.	25-013-0003	O3
<u>AMHERST</u> N. Pleasant St.	25-015-0103	O3
<u>BOSTON</u> Kenmore Square 590 Commonwealth Ave.	25-025-0002	SO2;NO2;NO;CO;PB;PM10;TSP; TEMP;RAD
<u>BOSTON</u> Fire Headquarters Southampton St.	25-025-0012	PM10;TSP;RAD; TSP shutdown 10/22/92
<u>BOSTON</u> Sumner Tunnel Visconti St. East Boston	25-025-0016	CO
<u>BOSTON</u> 340 Breman St. East Boston	25-025-0024	SO2;NO2;NO;CO;PM10; RAD
<u>BOSTON</u> Fire Station 200 Columbus Ave.	25-025-0024	PM10;RAD
<u>BOSTON</u> 1 City Square Charlestown	25-025-0027	PM10;PB;TSP;RAD
<u>BOSTON</u> Post Office Square	25-025-0038	CO
<u>CHELSEA</u> Soldier's Home Powder Horn Hill	25-025-1003	O3;SO2;NO2;NO;TSP;WS/WD; TSP shutdown 9/28/92
<u>CHICOPEE</u> Westover AFB	25-013-0008	O3
<u>EASTON, NORTH</u> Post Office 300 Main St.	25-005-1001	O3;WS/WD;SOLAR RAD
<u>FAIRHAVEN</u> Wood School Scontuit Rd.	25-005-1002	O3;WS/WD

PUBLIC SITE DIRECTORY

CITY SITE LOCATION	AIRS CODE	PARAMETERS MONITORED
<u>FALL RIVER</u> Fire Headquarters 165 Bedford St.	25-005-3001	PM10;RAD
<u>FALL RIVER</u> Fire Station Globe St.	25-005-1004	PM10;RAD
<u>LAWRENCE</u> Storrow Park High St.	25-009-0005	O3;SO2;WS/WD;PM10; RAD
<u>LOWELL</u> Old City Hall Merrimack St.	25-017-0007	CO
<u>MEDFORD</u> Fire Headquarters 100-120 Main St.	25-017-3002	PM10;RAD
<u>NEW BEDFORD</u> YMCA 25 Water St.	25-005-2004	PM10;RAD
<u>NEWBURYPORT</u> National Wildlife Headquarters Plum Island	25-009-4003	O3;WS/WD;SOLAR RAD
<u>QUINCY</u> Fire Station Hancock St.	25-021-0007	PM10;RAD
<u>SCITUATE</u> Police Station First Parish Rd.	25-023-2001	O3
<u>SPRINGFIELD</u> Howard School 59 Howard St.	25-013-0011	PM10;PB;TSP;RAD
<u>SPRINGFIELD</u> Liberty St.	25-013-0016	SO2;NO2;NO;SO;CO;WS/WD;TEMP; RH
<u>SPRINGFIELD</u> Longhill Ave.	25-013-1009	SO2
<u>SPRINGFIELD</u> 1586 Columbus Ave.	25-013-2007	CO;PM10;PB;TSP;RAD

PUBLIC SITE DIRECTORY

CITY SITE LOCATION	AIRS CODE	PARAMETERS MONITORED
<u>SUDBURY</u> Nat. Wildlife Refuge Water Row Rd.	24-017-1801	O3;PM10;WS/WD;TEMP; RAD
<u>TRURO</u> Cape Cod National Park Fox Bottom Area	25-001-0002	O3
<u>WALTHAM</u> U. Mass Field Station Beaver St.	25-017-4003	O3;Acid Rain
<u>WARE</u> Quabbin Summit	25-015-4002	O3;SO2;NO2;NO;PM10;WS/WD; TEMP;BP;RH;SOLAR RAD; RAD;IMPROVE
<u>WEST SPRINGFIELD</u> Fire Station Van Deene St.	25-013-5003	PM10;RAD
<u>WORCESTER</u> U. Mass Medical Center 419 Belmont St.	25-027-0013	PM10;RAD
<u>WORCESTER</u> Worcester Airport	25-027-0015	O3 Site startup 4/14/92
<u>WORCESTER</u> YWCA 2 Washington St.	25-027-0016	PM10;RAD
<u>WORCESTER</u> State DPW Yard Belmont St.	25-027-0019	O3;SO2;WS/WD;TEMP
<u>WORCESTER</u> Fire Station Central St.	25-027-0020	SO2;NO2;NO;CO
<u>WORCESTER</u> Franklin and Grafton St.	25-027-0022	CO Site startup 7/28/92

TABLE 6: 1992 INDUSTRIAL NETWORK DESCRIPTION

<u>NUMBER OF MONITORING STATIONS</u>	30
<u>NUMBER OF CITIES WITH MONITORING STATIONS</u>	18
<u>CONTINUOUS CRITERIA POLLUTANT (NO₂,SO₂) MONITORS</u>	24
4 NO ₂ (Nitrogen Dioxide)	
20 SO ₂ (Sulfur Dioxide)	
<u>NONCONTINUOUS CRITERIA POLLUTANT (PM₁₀) MONITORS</u>	1
1 PM ₁₀ (Particulate Matter-10 microns).	
<u>METEOROLOGICAL MONITORS</u>	24
2 TEMP (Temperature)	
11 WD (Wind Direction)	
11 WS (Wind Speed)	
<u>OTHER MONITORS</u>	24
10 SO ₄ (Sulfate)	
Two stations have collocated ¹ monitors.	
14 TSP (Total Suspended Particulates)	
Two stations have collocated ¹ monitors.	

¹ Monitors are collocated (2 monitors at a station which run simultaneously) in order to assess precision.

TABLE 7: INDUSTRIAL SITE DIRECTORY

REPORTING ORGANIZATION CITY SITE LOCATION	AIRS CODE	PARAMETERS MONITORED
<u>ATLANTIC GELATIN</u> Stoneham Hill Street	25-017-1701	SO2;WS/WD
<u>BOSTON EDISON</u> Boston Atlantic Avenue	25-025-0018	SO2;TSP;SO4; Site shutdown 10/22/92
<u>BOSTON EDISON</u> Boston Long Island	25-025-0019	SO2;WS/WD;TSP;SO4
<u>BOSTON EDISON</u> Dorchester Dewar Street	25-025-0020	SO2;WS/WD;TSP;SO4
<u>BOSTON EDISON</u> East Boston Breman Street	25-025-0021	SO2;WS/WD;TSP;SO4
<u>EASTMAN GELATINE</u> Peabody Fox Hill	25-009-1005	SO2;WS/WD
<u>EASTMAN GELATINE</u> Peabody Meadow Pond	25-009-1004	SO2;WS/WD
<u>GENERAL ELECTRIC</u> Lynn Lynnway Street	25-009-2003	SO2;WS/WD;TSP
<u>HAVERHILL PAPERBOARD</u> Haverhill Nettle School	25-009-5004	SO2;WS/WD
<u>MATEP</u> Brookline Fisher Hill Reservoir	25-021-0008	NO;NO2
<u>MATEP</u> Brookline Rte. 9 & Chestnut Hill Ave.	25-021-0009	NO;NO2
<u>MATEP</u> Boston Children's Hospital	25-025-0035	NO;NO2

INDUSTRIAL SITE DIRECTORY

REPORTING ORGANIZATION CITY SITE LOCATION	AIRS CODE	PARAMETERS MONITORED
<u>MATEP</u> Boston Deaconess Hospital	25-025-0036	NO;NO2
<u>MATEP</u> Boston Mission Park Building	25-025-0039	WS/WD
<u>NEW ENGLAND POWER CO.</u> Fall River Globe Street	25-005-0010	SO2
<u>NEW ENGLAND POWER CO.</u> Swansea Sharp's Lot Road	25-005-6001	SO2;WS/WD;TSP;TEMP
<u>NEW ENGLAND POWER CO.</u> Salem Fort Avenue	25-009-2004	WS/WD;TEMP
<u>NEW ENGLAND POWER CO.</u> Marblehead Green Street	25-009-3003	SO2;TSP
<u>NORTHEAST UTILITIES</u> Holyoke Mt. Tom Power Plant	25-013-1005	SO2
<u>NORTHEAST UTILITIES</u> Springfield Longhill Ave.	25-013-1009	SO2
<u>NORTHEAST UTLILITES</u> Springfield Carew Street	25-013-1010	SO2
<u>NORTHEAST UTILITIES</u> West Springfield Power Plant	25-013-5002	SO2
<u>NORTHEAST UTILITIES</u> Hadley Summit House	25-015-1002	SO2 Site shutdown 2/7/92
<u>NORTHEAST UTILITIES</u> South Hadley Hopkins Academy	25-015-2001	SO2

INDUSTRIAL SITE DIRECTORY

REPORTING ORGANIZATION CITY SITE LOCATION	AIRS CODE	PARAMETERS MONITORED
<u>NORTHEAST UTILITIES</u> South Hadley Pine Street	25-015-3002	SO2
<u>PIONEER VALLEY TSP GROUP</u> Chicopee Grattan & Meadow St.	25-013-0006	TSP;SO4
<u>PIONEER VALLEY TSP GROUP</u> Springfield Rose & Page Street	25-013-0013	TSP;SO4; Site shutdown 7/5/92
<u>PIONEER VALLEY TSP GROUP</u> Springfield Longhill Ave.	25-013-1009	TSP;SO4;PM10; TSP,SO4 shutdown 7/5/92 PM10 startup 7/11/92
<u>PIONEER VALLEY TSP GROUP</u> Northampton Smith College	25-015-0003	TSP;SO4; Site shutdown 7/5/92
<u>WELLESLEY COLLEGE</u> Wellesley Observatory Building	25-021-5001	SO2;TSP

2. EXCEEDANCES OF AMBIENT AIR QUALITY STANDARDS

The Ambient Air Quality Standards are listed in Table 2 on page 4. Exceedances of the ambient air quality standards during 1992 occurred in the public network for ozone (O3) and carbon monoxide (CO). There were no exceedances in the industrial network.

Areas not meeting air quality standards are designated as "nonattainment" areas. The O3 air quality standard is based on estimated exceedances of the 0.12 ppm standard being greater than 1 per year at a site. Massachusetts is nonattainment statewide for ozone.

The CO air quality standards are not to be exceeded more than once a year at a site. If the 2nd maximum value at a site does not exceed the

standard then the standard has not been violated. None of the 2nd maximum values for CO exceeded the standards during 1992.

2.1 OZONE EXCEEDANCES

The ozone one hour standard of 0.12 ppm was exceeded at five of the fifteen sites at which ozone was monitored. There were four exceedance days (days ozone exceedances occurred) during the year. Two sites exceeded the standard on more than one day.

Table 8 lists the exceedances of the ozone standard during 1992.

Table 9 lists the ozone exceedance days during 1992.

TABLE 8: 1992 OZONE EXCEEDANCES

CITY	AIRS CODE	DATE	HOUR	O3 VALUE (PPM)
ADAMS	25-003-4002	5/23	900	0.133
CHICOPEE	25-013-0008	6/14	1700	0.131
EASTON	25-005-1001	6/13	1700	0.130
WARE	25-015-4002	6/14	1700	0.131
		6/29	1800	0.136
WORCESTER AIRPORT	25-027-0015	5/23	2200	0.125
		6/13	1900	0.137

03 Exceedance Days 1982 to 1992 *Number of days when Ozone exceeded the standard (0.12 ppm)*

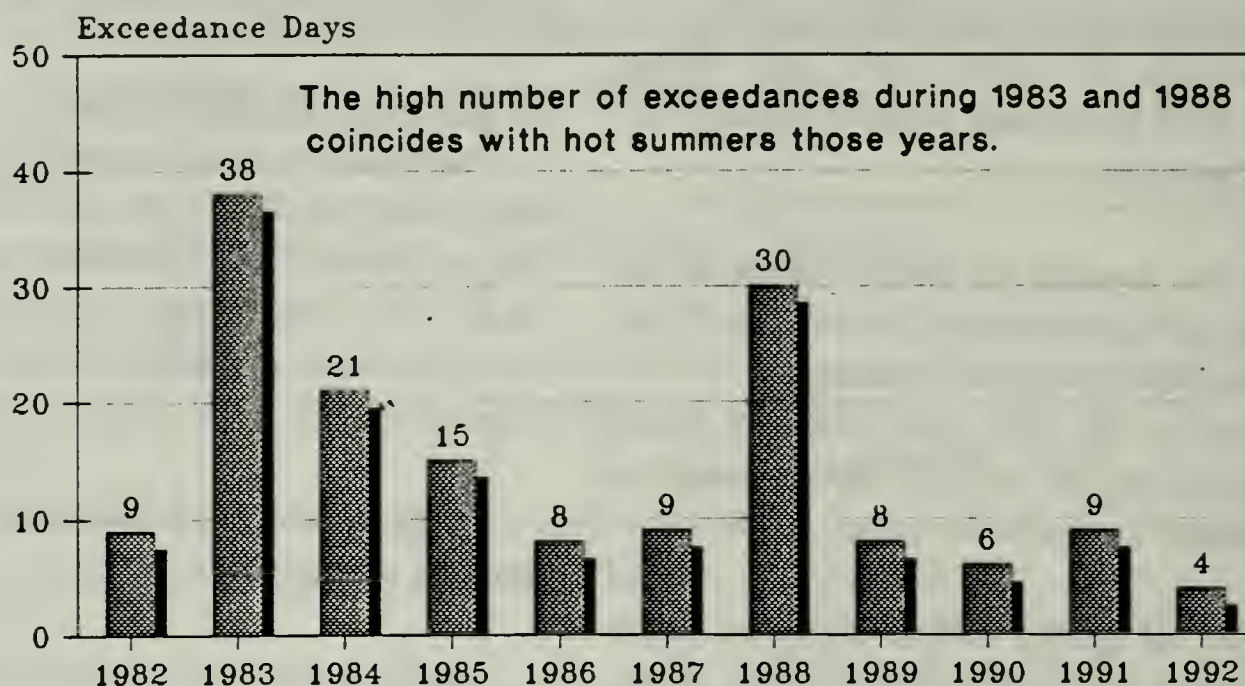


figure 1

TABLE 9: 1992 OZONE EXCEEDANCE DAYS

DATE OF EXCEEDANCE	HIGHEST EXCEEDANCE SITE	AIRS CODE	MAXIMUM EXCEEDANCE VALUE (PPM)	NUMBER OF EXCEEDANCE SITES
5/23	ADAMS	25-003-4002	0.133	2
6/13	WORCESTER AIRPORT	25-027-0015	0.137	2
6/14	CHICOPEE & WARE	25-013-0008 25-015-4002	0.131	2
6/29	WARE	25-015-4002	0.136	1

2.2 CARBON MONOXIDE EXCEEDANCES

The carbon monoxide 8 hour standard of 9 ppm was exceeded at the Worcester (Central St.) site. It was the only exceedance that occurred out of the eight carbon monoxide monitoring sites. The last exceedance of the 8 hour standard occurred in 1991, at the same site.

The CO air quality standards are not to be exceeded more than once a year at a site. If the

2nd maximum value at a site does not exceed the standard then the standard has not been violated. None of the 2nd maximum values for CO exceeded the standards during 1992. The last violation of the CO 8 hour standard occurred in 1986 in Boston.

Table 10 lists information about the carbon monoxide exceedance.

TABLE 10: 1992 CARBON MONOXIDE EXCEEDANCES

CITY	AIRS CODE	DATE	HOUR	CO VALUE (PPM)
WORCESTER	25-027-0020	1/01	0 TO 7	9.7

CO 8-Hr Exceedances 1982 to 1992
of Exceedance Days and Violation Sites
8-Hr Standard = 9 ppm

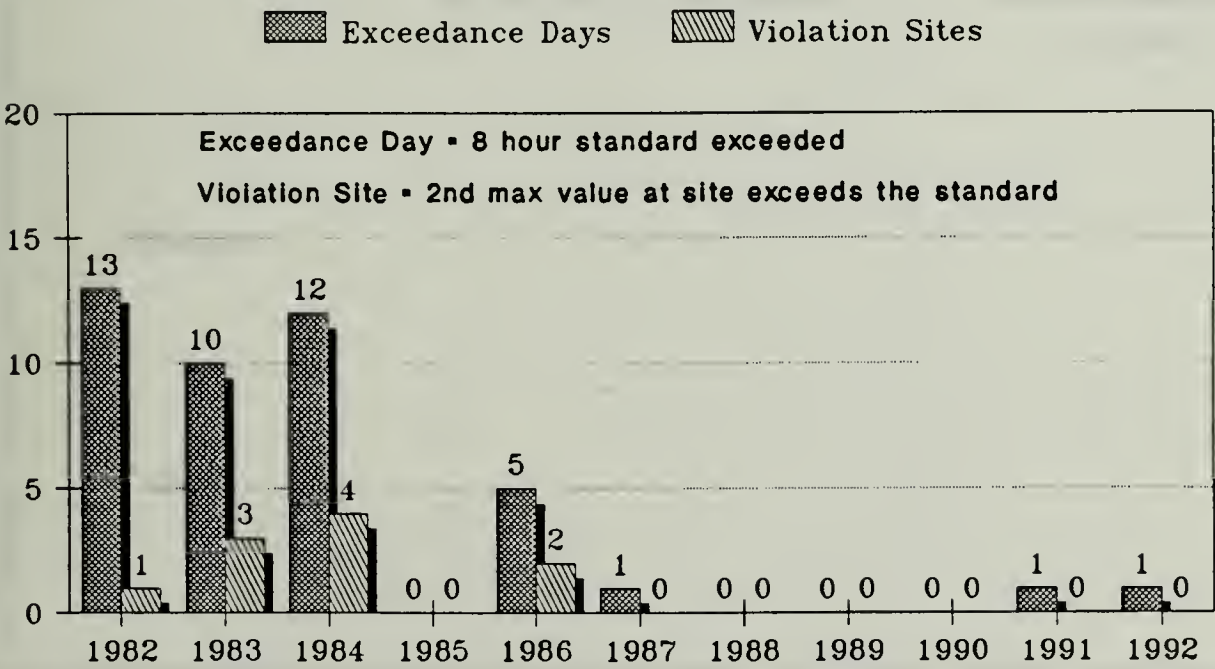


figure 2

3. AMBIENT AIR QUALITY DATA - PUBLIC NETWORK

3.1 POLLUTANT STANDARD INDEX (PSI)

The Pollutant Standard Index (PSI) provides a simple, uniform way to report concentrations of ozone (O₃), which is the primary component of smog. A PSI value of 100 is equivalent to the national ambient air quality standard for O₃ (0.12 ppm).

The Division of Air Quality Control (DAQC) predicts the day's O₃ PSI value during ozone season (April through October) using the weather forecast and evaluating the previous day's O₃ and oxides of nitrogen (NO,NO₂) levels from the

statewide monitoring network. The DAQC reports O₃ PSI values daily during ozone season for the Eastern, Central and Western regions of Massachusetts.

Table 11 lists the health effects associated with the different PSI categories and values.

Table 12 lists the number of days during the 1992 ozone season that fell into the good, moderate or unhealthful categories for each region.

TABLE 11: POLLUTANT STANDARD INDEX (PSI) AND GENERAL HEALTH EFFECTS

INDEX VALUE	PSI DESCRIPTOR	GENERAL HEALTH EFFECTS	CAUTIONARY STATEMENTS
500	Very Hazardous	Premature death of ill and elderly. Healthy persons will experience adverse symptoms ¹ that affect their normal activities.	All persons should remain indoors, keeping windows and doors closed. All persons should minimize physical exertion and avoid traffic areas.
400	Hazardous	Premature onset of heart and lung diseases. Significant aggravation of symptoms ¹ and decreased exercise tolerance in healthy persons.	Elderly and persons with existing respiratory diseases should stay indoors and avoid physical exertion. General population should avoid physical activity.
300	Very Unhealthful	Significant aggravation of symptoms ¹ and decreased exercise tolerance in persons with heart or lung disease. Widespread symptoms ¹ in the healthy population.	Elderly and persons with existing heart or lung diseases should stay indoors and avoid physical activity.
200	Unhealthful	Mild aggravation of symptoms ¹ in susceptible persons. Irritation symptoms ¹ in the healthy population.	Persons with existing heart or respiratory ailments should reduce physical exertion and outdoor activity.
100	Moderate		
50	Good		
0			

¹ Symptoms include eye and throat irritation and respiratory problems such as breathing difficulty and congestion.

TABLE 12: 1992 PSI BY REGION DURING OZONE SEASON

MONTH	REGION	GOOD PSI	MODERATE PSI	UNHEALTHFUL PSI
APRIL	Eastern	26	4	0
	Central	28	2	0
	Western	28	2	0
MAY	Eastern	18	12	1
	Central	20	10	1
	Western	19	12	0
JUNE	Eastern	7	22	1
	Central	14	14	2
	Western	17	11	2
JULY	Eastern	11	20	1
	Central	21	10	0
	Western	21	10	1
AUGUST	Eastern	13	17	1
	Central	19	12	0
	Western	6	24	1
SEPTEMBER	Eastern	24	6	0
	Central	24	6	0
	Western	19	11	0
OCTOBER	Eastern	27	4	0
	Central	30	1	0
	Western	24	7	0
TOTAL (OZONE SEASON)	Eastern	126	85	3
	Central	156	55	3
	Western	134	77	3

DEFINITION OF PSI CATEGORIES	
GOOD	PSI OF 0 TO 50
MODERATE	PSI OF 51 TO 100
UNHEALTHFUL	PSI OF 101 TO 200

REGION	COUNTY
EASTERN	Essex, Middlesex, Suffolk, Norfolk, Bristol, Plymouth, Barnstable
CENTRAL	Worcester
WESTERN	Berkshire, Franklin, Hampshire, Hampden

Number of Days in PSI Categories *By region during 1992 Ozone season* *(April through October)*

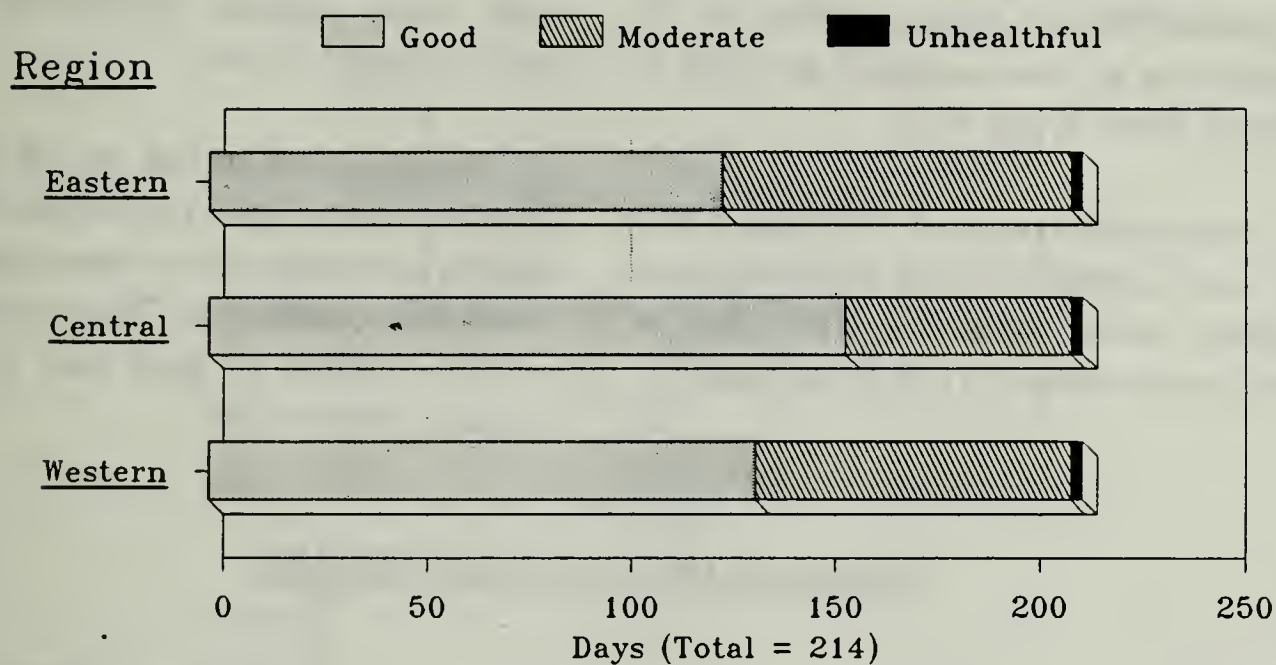


figure 3

DEFINITION OF PSI CATEGORIES	
GOOD	PSI OF 0 TO 50
MODERATE	PSI OF 51 TO 100
UNHEALTHFUL	PSI OF 101 TO 200

3.2 OZONE (O3) DATA SUMMARY

There were sixteen O3 sites during 1992 in the state operated network. A new site was established at the Worcester Airport in April. All of the sites achieved 75% or greater data capture except Adams (71%) and Agawam (66%). The O3 data capture for all sites combined is shown in Section 3.10, figure 30 (pg 46).

The O3 air quality standard (0.12 ppm 1-hour average) was exceeded at five of the sixteen sites. The highest 1-hour value was 0.137 ppm at Worcester Airport which is 114% of the standard.

See Section 2.1 (pg 14) for more information regarding O3 exceedances.

O3 is measured by an automated analyzer which takes samples continuously to provide hourly averaged values.

Table 13 lists by site the O3 data during the ozone season (April 1 to October 31) including the four maximum 1-hour values, the number of values that exceeded the O3 air quality standard and the number of days that O3 data was reported (100% is 214).

TABLE 13: 1992 O3 DATA SUMMARY

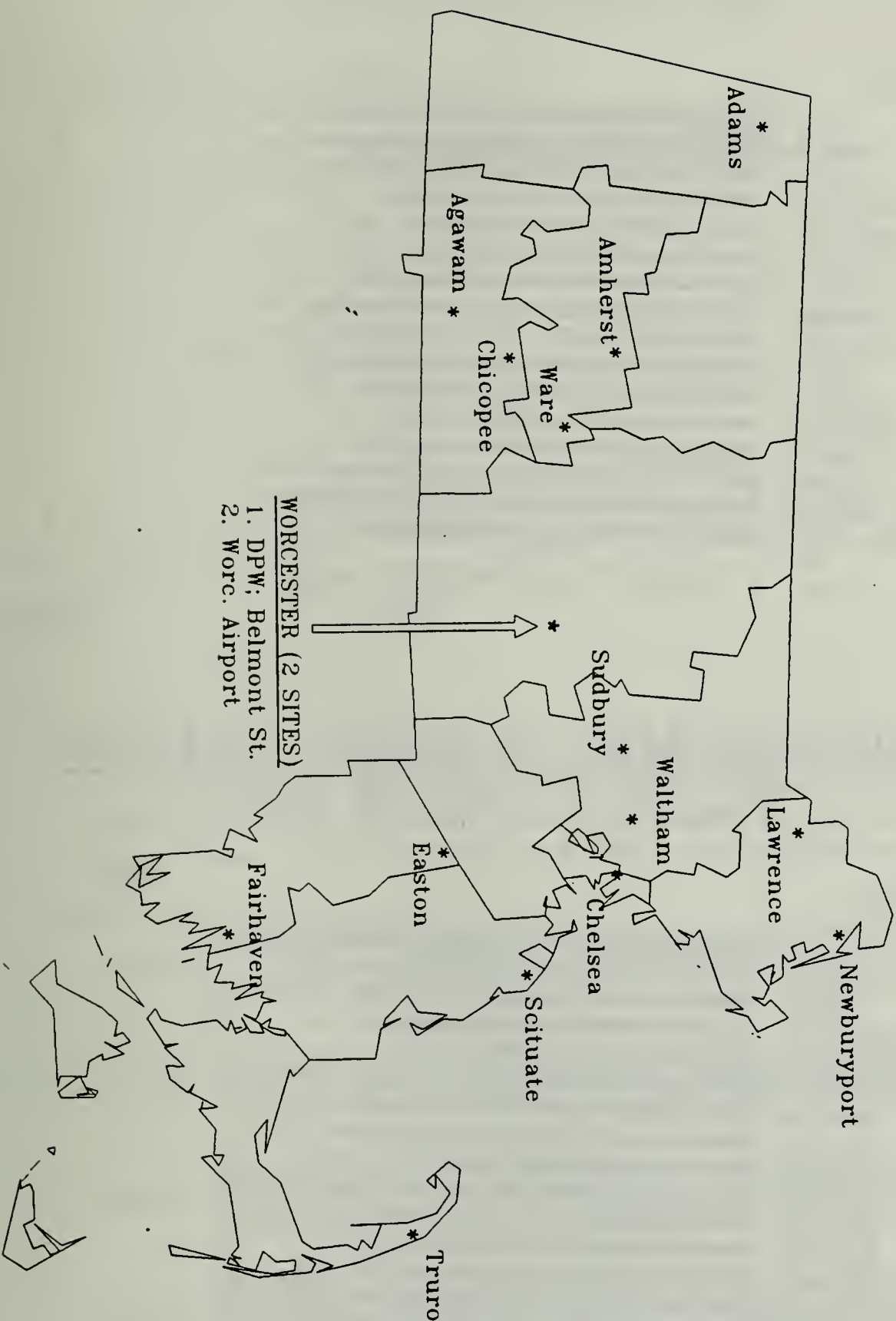
OZONE (44201)				MASSACHUSETTS				UNITS: 007 PPM							
				OZONE SEASON: APR 01 TO OCT 31											
								VALID DAILY 1-HR MAXIMUM						* MISS DAY	
								-----MAXIMA-----				VALS>.125		* ASSUMED	
SITE ID	P O M C T CITY	COUNTY	ADDRESS	REP ORG	NUM MEAS	NUM REQ	1ST	2ND	3RD	4TH	MEAS	EST	* STANDARD		
25-001-0002	1 2 TRURO	BARNSTABLE	FOX BOTTOM AREA	001	212	214	.122	.120	.116	.106	0	0.0	2		
25-003-4002	1 2 ADAMS	BERKSHIRE C	MT. GREYLOCK	001	152	214	.133	.109	.103	.101	1	1.4	3		
25-005-1001	1 1 EASTON	BRISTOL CO	N. EASTON POST O	001	205	214	.130	.110	.109	.100	1	1.0	2		
25-005-1002	1 2 FAIRHAVEN	BRISTOL CO	L. WOOD SCHOOL	001	211	214	.111	.109	.108	.108	0	0.0	3		
25-009-0005	1 1 LAWRENCE	ESSEX CO	HIGH STREET	001	195	214	.100	.086	.083	.080	0	0.0	4		
25-009-4003	1 1 NEWBURYPORT	ESSEX CO	PARKER RIVER NWR	001	207	214	.119	.114	.106	.104	0	0.0	3		
25-013-0003	1 2 AGAWAM	HAMPDEN CO	152 S. WESTFIELD	001	148	214	.115	.109	.097	.096	0	0.0	1		
25-013-0008	1 1 CHICOPEE	HAMPDEN CO	WESTOVER AFB	001	214	214	.131	.121	.114	.113	1	1.0	0		
25-015-0103	1 2 AMHERST	HAMPSHIRE C	N. PLEASANT ST.	001	211	214	.119	.107	.104	.094	0	0.0	2		
25-015-4002	1 1 WARE	HAMPSHIRE C	QUABBIN SUMMIT	001	206	214	.136	.131	.122	.119	2	2.0	3		
25-017-1801	1 1 SUDBURY	MIDDLESEX C	WATER ROW ROAD	001	210	214	.113	.113	.105	.101	0	0.0	4		
25-017-4003	1 2 WALTHAM	MIDDLESEX C	BEAVER STREET	001	209	214	.101	.101	.095	.094	0	0.0	1		
25-023-2001	1 2 SCITUATE	PLYMOUTH CO	SCITUATE POLICE	001	205	214	.113	.110	.103	.094	0	0.0	2		
25-025-1003	1 1 CHELSEA	SUFFOLK CO	POWDER HORN HILL	001	211	214	.122	.110	.104	.098	0	0.0	2		
25-027-0015	1 1 WORCESTER	WORCESTER C	WORC. AIRPORT	001	193	214	.137	.125	.123	.118	2	2.2	0		
25-027-0019	1 2 WORCESTER	WORCESTER C	DPW: BELMONT ST.	001	212	214	.114	.108	.107	.101	0	0.0	0		

PRIMARY STANDARD: 1-HOUR = 0.12 PPM
TO CONVERT UNITS FROM PPM TO $\mu\text{G}/\text{M}^3$ MULTIPLY PPM x 1960.8

ABBREVIATIONS AND SYMBOLS USED IN TABLE 13

SITE ID = AIRS SITE IDENTIFICATION NUMBER POC = PARAMETER OCCURRENCE CODE (DIFFERENTIATES BETWEEN MONITORS AT A SITE)
MT = MONITOR TYPE (1 = NAMS, 2 = SLAMS, 3 = OTHER) REP ORG = REPORTING ORGANIZATION NUM MEAS = NUMBER OF DAYS MEASURED
NUM REQ = NUMBER OF DAYS IN OZONE SEASON 1ST,2ND,3RD,4TH MAXIMA = MAXIMUM 1HR VALUE FOR THE 1ST,2ND,3RD,4TH HIGHEST DAY
VALS > 0.12 MEAS = NUMBER OF MEASURED DAILY MAXIMUM VALUES GREATER THAN OR EQUAL TO 0.12 PPM VALS > 0.12 EST = NUMBER
OF EXPECTED VIOLATIONS OF THE OZONE STANDARD MISS DAYS ASSUMED < STANDARD = NUMBER OF MISSING DAYS ASSUMED TO BE LESS
THAN THE OZONE STANDARD

1992 PUBLIC 03 MONITORING NETWORK



03 1st Max 1 Hour Values

Standard = 0.125 ppm

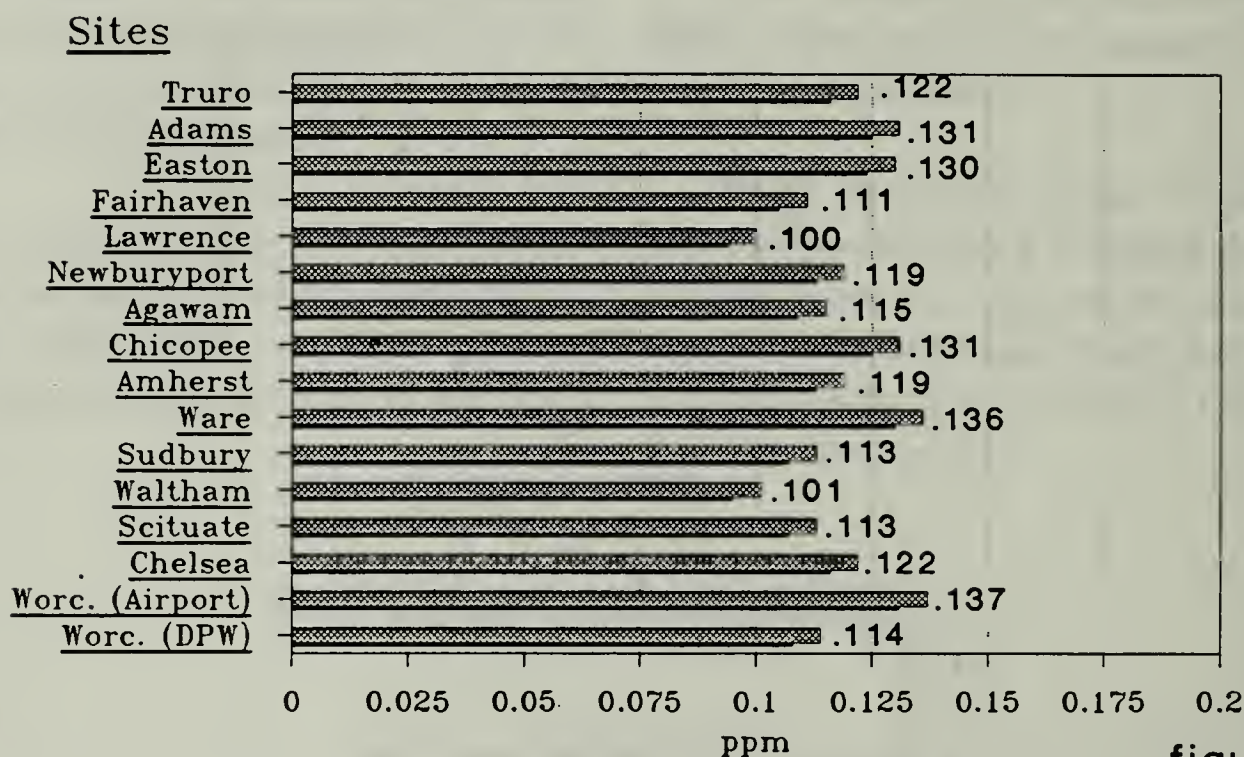


figure 4

03 2nd Max 1 Hour Values

Standard = 0.125 ppm

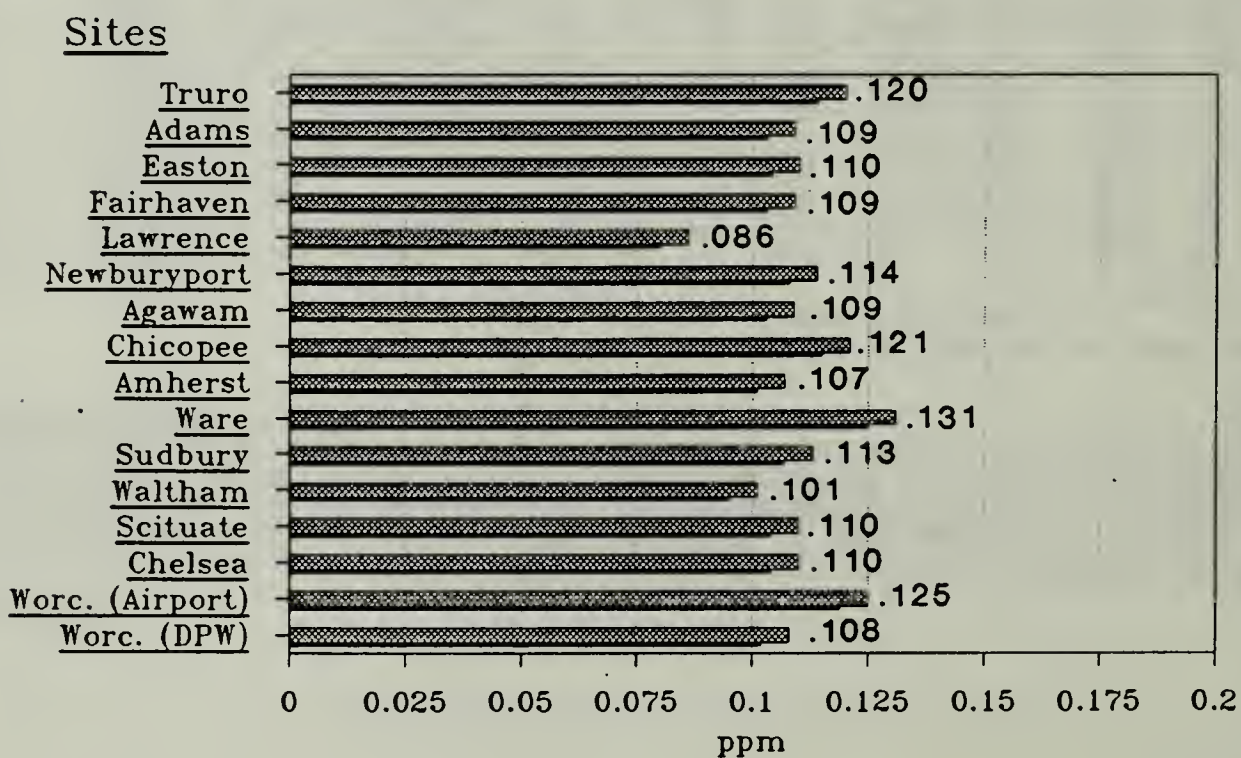


figure 5

03 5-Year Trend # of Days when 03 exceeded the standard (0.12 ppm)

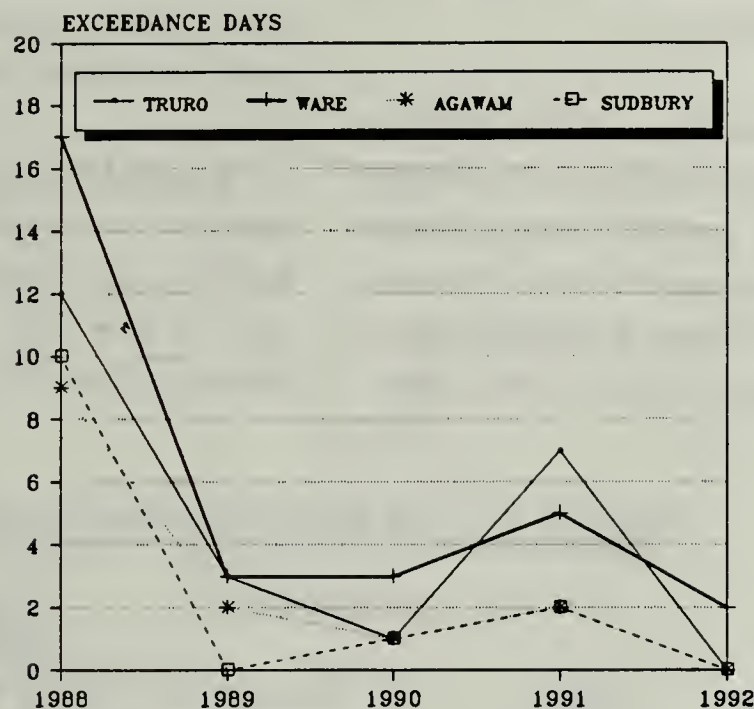


figure 6

1992 03 FREQUENCY DISTRIBUTION

Percentile Rankings of 1-HR Values (PPM)

The meaning of the 90th percentile is 90% of the values are less than that value and 10% of the values are greater.

Sites

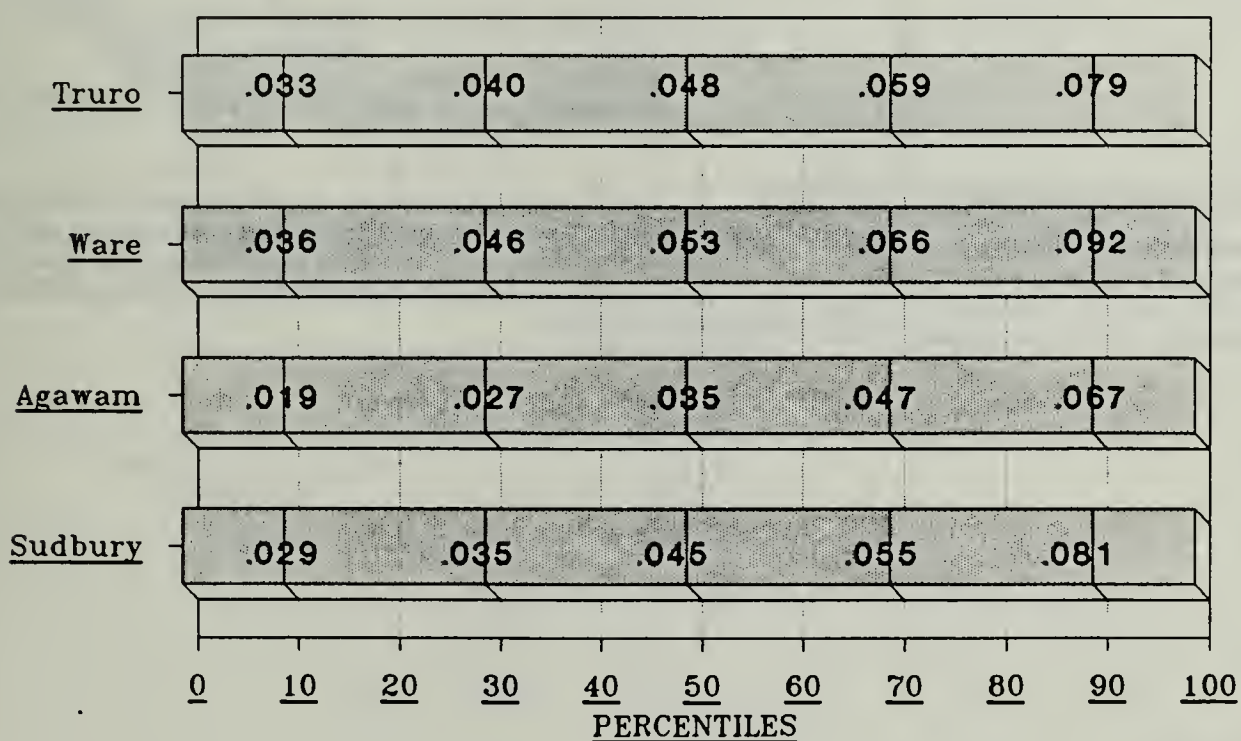


figure 7

3.3 SULFUR DIOXIDE (SO2) DATA SUMMARY

There were eleven SO2 sites during 1992 in the state operated network. All of the sites achieved 75% or greater data capture. The SO2 data capture for all sites combined is shown in section 3.10, figure 31 (pg 47).

There were no violations of the SO2 air quality standards during the year. The highest annual arithmetic mean was 0.012 ppm at Boston (Kenmore Square) which is 40% of the standard. The highest 24-hour value was 0.052 ppm also at Boston (Kenmore Square) which is 40% of the

standard. The highest 3-hour value was 0.098 ppm at Fall River which is 20% of the standard.

SO2 is measured by an automated analyzer which takes samples continuously to provide hourly averaged values.

Table 14 lists by site the SO2 data for 1992 including the number of hour observations (100% is 8784); the 1st and 2nd maximum values for 24 hour, 3 hour and 1 hour periods; as well as the annual arithmetic mean.

TABLE 14: 1992 SO2 DATA SUMMARY

SULFUR DIOXIDE (42401)					MASSACHUSETTS				UNITS: 007 PPM						ANN AR13 MEAN
SITE ID	P O M C T CITY	COUNTY	ADDRESS	REP ORG	#OBS	MAX 24-HR		OBS >	MAX 3-HR		OBS >	MAX 1-HR			
						1ST	2ND	0.14	1ST	2ND	0.50	1ST	2ND		
25-005-1004	1 1	FALL RIVER	BRISTOL CO	GLOBE STREET	001	8549	.041	.040	0	.098	.092	0	.178	.170	.008
25-009-0005	1 1	LAWRENCE	ESSEX CO	HIGH STREET	001	8508	.034	.029	0	.055	.051	0	.088	.084	.008
25-013-0016	1 1	SPRINGFIELD	HAMPDEN CO	LIBERTY STREET	001	8708	.047	.045	0	.065	.064	0	.120	.090	.009
25-013-1009	1 1	SPRINGFIELD	HAMPDEN CO	LONGHILL STREET	001	8541	.039	.035	0	.059	.055	0	.070	.069	.008
25-015-4002	1 2	WARE	HAMPSHIRE CO	QUABBIN SUMMIT	001	8492	.024	.022	0	.045	.040	0	.047	.046	.004
25-017-4003	1 1	WALTHAM	MIDDLESEX CO	BEAVER STREET	001	8413	.035	.030	0	.069	.057	0	.072	.072	.006
25-025-0002	1 1	BOSTON	SUFFOLK CO	KENMORE SQUARE	001	8447	.052	.045	0	.086	.079	0	.098	.098	.012
25-025-0021	1 1	BOSTON	SUFFOLK CO	340 BREMAN STREET	001	8714	.036	.034	0	.068	.063	0	.073	.072	.009
25-025-1003	1 1	CHELSEA	SUFFOLK CO	POWDER HORN HILL	001	8321	.046	.042	0	.085	.082	0	.103	.097	.010
25-027-0019	1 2	WORCESTER	WORCESTER CO	DPW; BELMONT ST.	001	8722	.021	.021	0	.034	.033	0	.047	.042	.006
25-027-0020	1 1	WORCESTER	WORCESTER CO	CENTRAL STREET	001	8441	.038	.033	0	.068	.058	0	.083	.073	.008

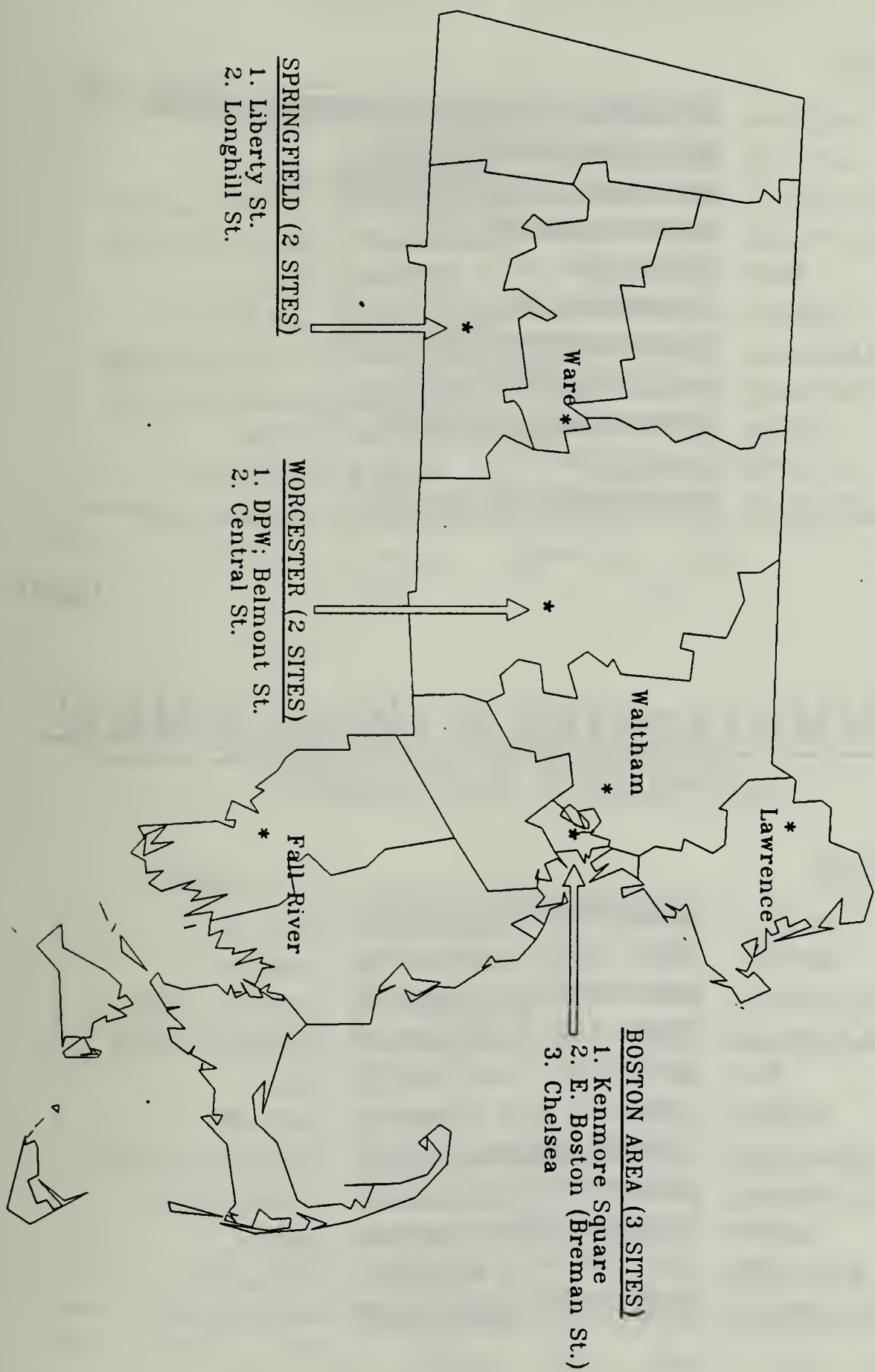
PRIMARY STANDARDS: ANNUAL ARITHMETIC MEAN = 0.03 PPM
24-HOUR = 0.14 PPM

SECONDARY STANDARD: 3-HOUR = 0.50 PPM
TO CONVERT UNITS FROM PPM TO $\mu\text{G}/\text{M}^3$ MULTIPLY PPM x 2620

ABBREVIATIONS AND SYMBOLS USED IN TABLE 14

SITE ID = AIRS SITE IDENTIFICATION NUMBER POC = PARAMETER OCCURENCE CODE (DIFFERENTIATES BETWEEN MONITORS AT A SITE)
MT = MONITOR TYPE (1 = NAMS, 2 = SLAMS, 3 = OTHER) REP ORG = REPORTING ORGANIZATION #OBS = NUMBER OF HOUR OBSERVATIONS
MAX 24-HR, MAX 3-HR, MAX 1-HR 1ST 2ND = FIRST AND SECOND HIGHEST VALUE FOR TIME PERIOD INDICATED OBS > .14 = NUMBER OF 24-HR
AVG. GREATER THAN 0.14 PPM (24-HR STANDARD) OBS > .50 = NUMBER OF 3-HR AVG. GREATER THAN 0.50 PPM (3-HR STANDARD)
ANN ARIT MEAN = ANNUAL ARITHMETIC MEAN (STANDARD = 0.03 PPM)

1992 PUBLIC SO₂ MONITORING NETWORK



S02 Maximum 1 Hour Values

Standard = None

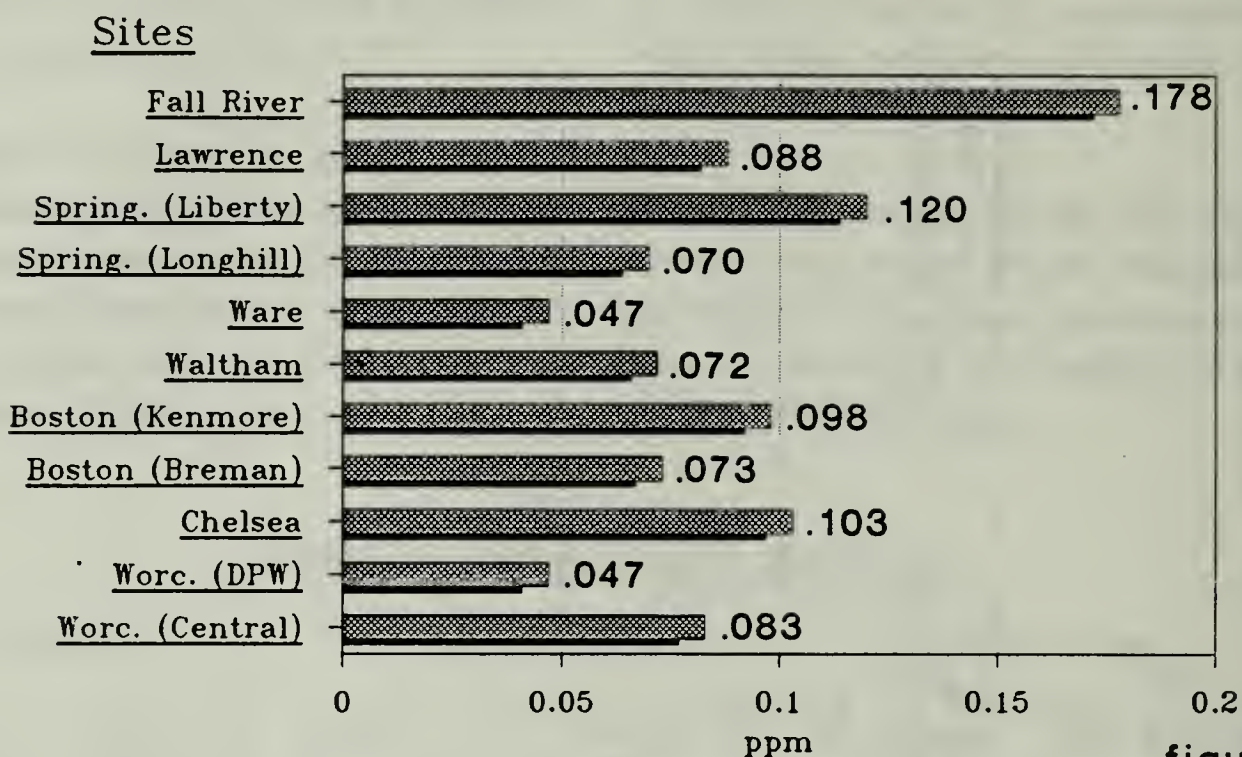


figure 8

S02 Maximum 3 Hour Values

Standard = 0.5 ppm

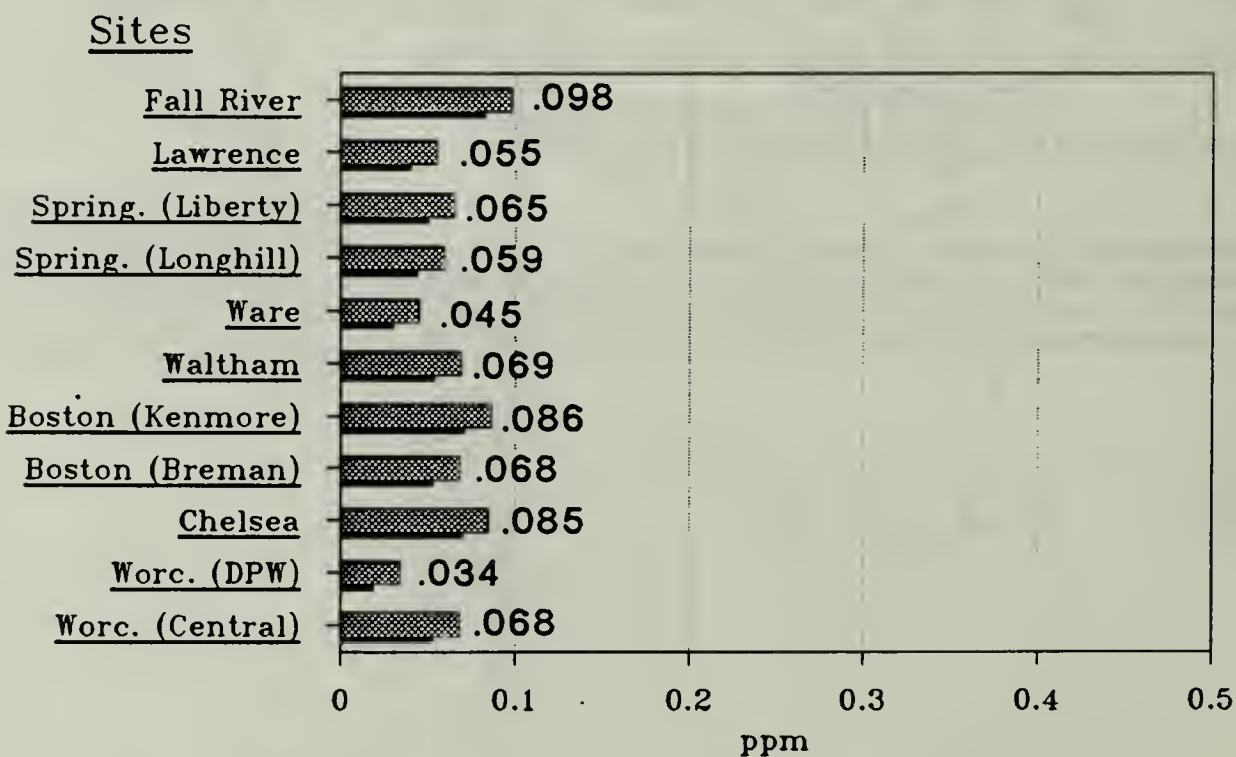


figure 9

S02 Maximum 24 Hour Values

Standard = 0.14 ppm

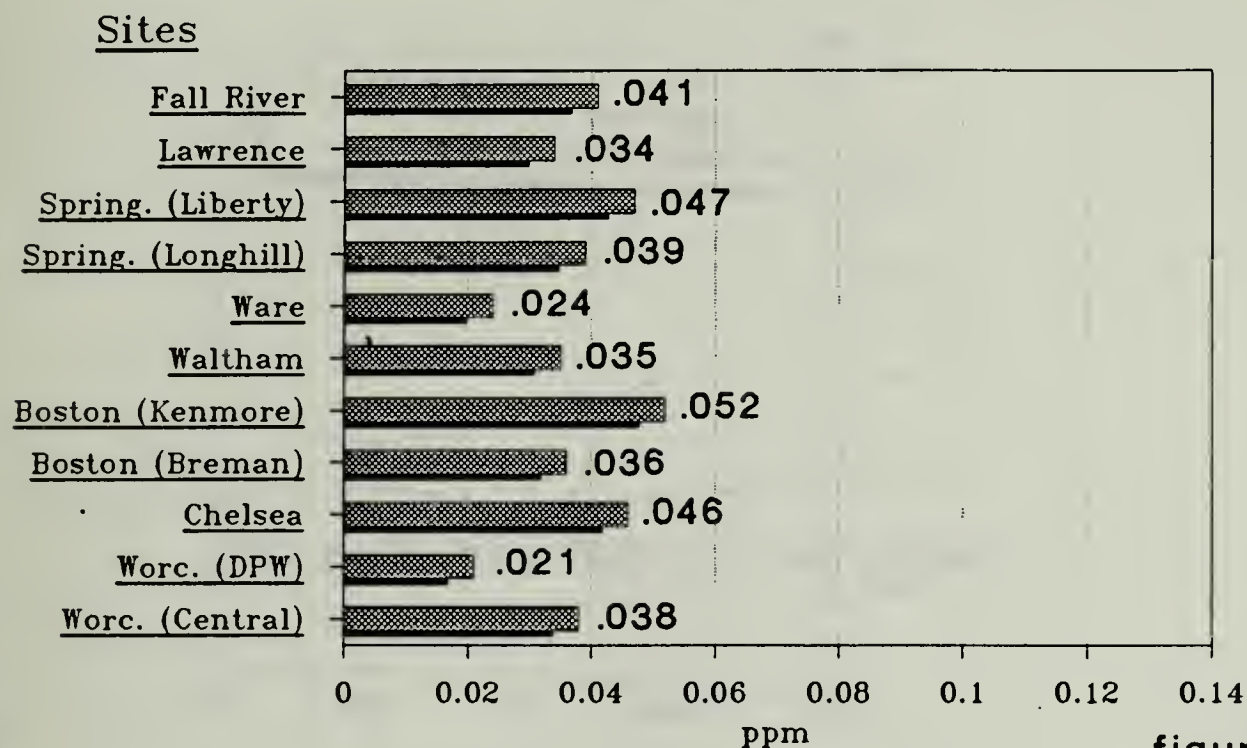


figure 10

S02 Annual Arithmetic Means

Standard = 0.03 ppm

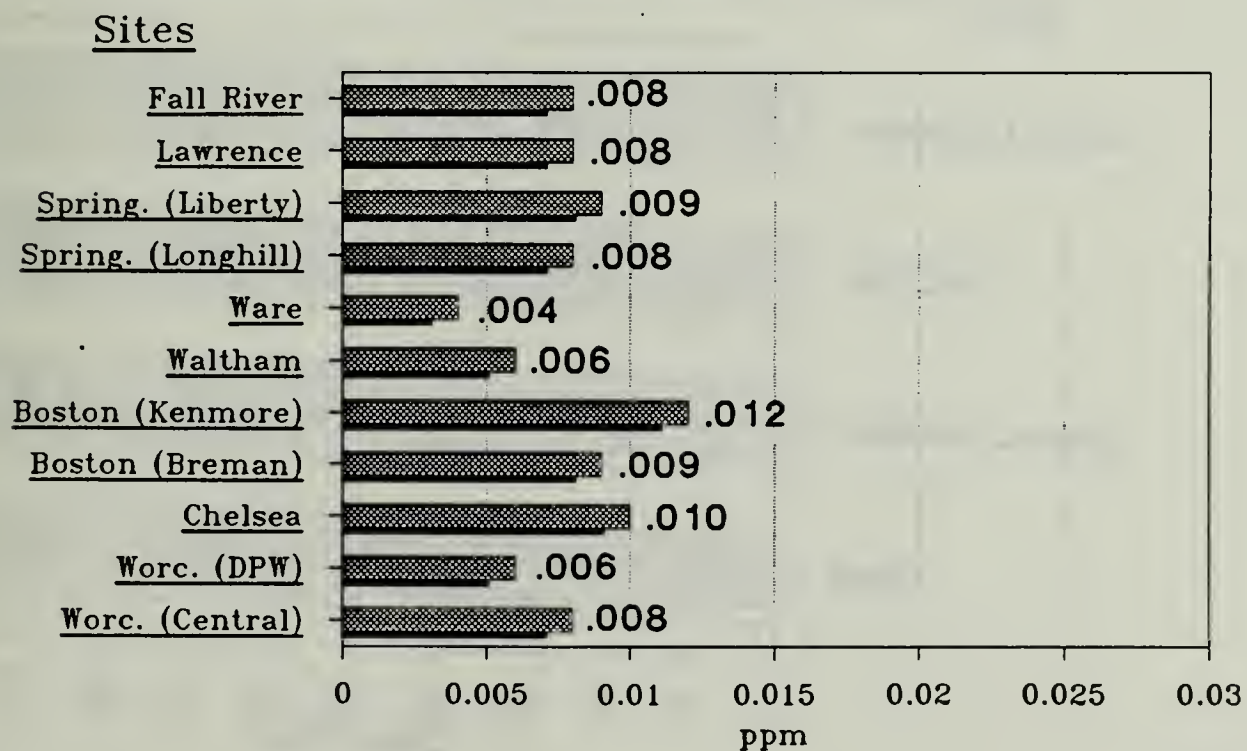


figure 11

S02 5-Year Trend

Annual Arithmetic Mean

Standard = 0.03 ppm

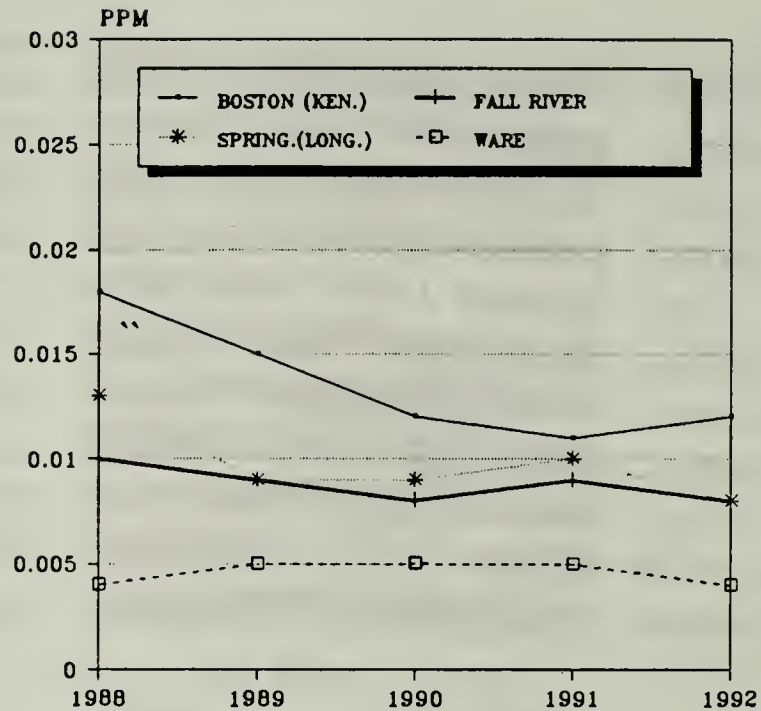


figure 12

1992 S02 FREQUENCY DISTRIBUTION

Percentile Rankings of 1-HR Values (PPM)

The meaning of the 90th percentile is 90% of the values are less than that value and 10% of the values are greater.

Sites

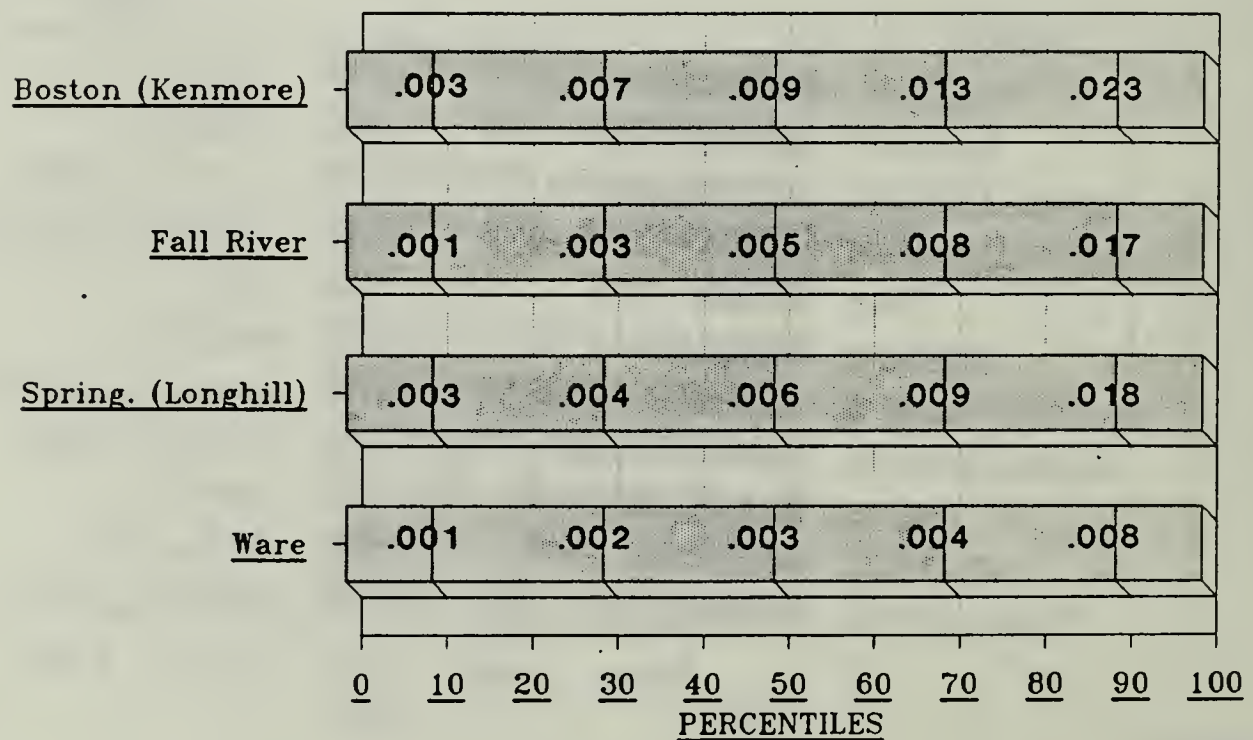


figure 13

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3.4 NITROGEN DIOXIDE (NO2) DATA SUMMARY

There were six NO2 sites during 1992 in the state operated network. All of the sites achieved 75% or greater data capture. The NO2 data capture for all sites combined is shown in Section 3.10, figure 32 (pg 47).

There were no violations of the NO2 air quality standard during the year. The highest annual arithmetic mean was 0.033 ppm at Boston (Kenmore Sq.) which is 66% of the standard.

NO2 is measured by an automated analyzer which takes samples continuously to provide hourly averaged values.

Table 15 lists by site the NO2 data for 1992 including the number of hour observations (100% is 8784); the 1st and 2nd maximum 1-hour values; and the annual arithmetic mean.

TABLE 15: 1992 NO2 DATA SUMMARY

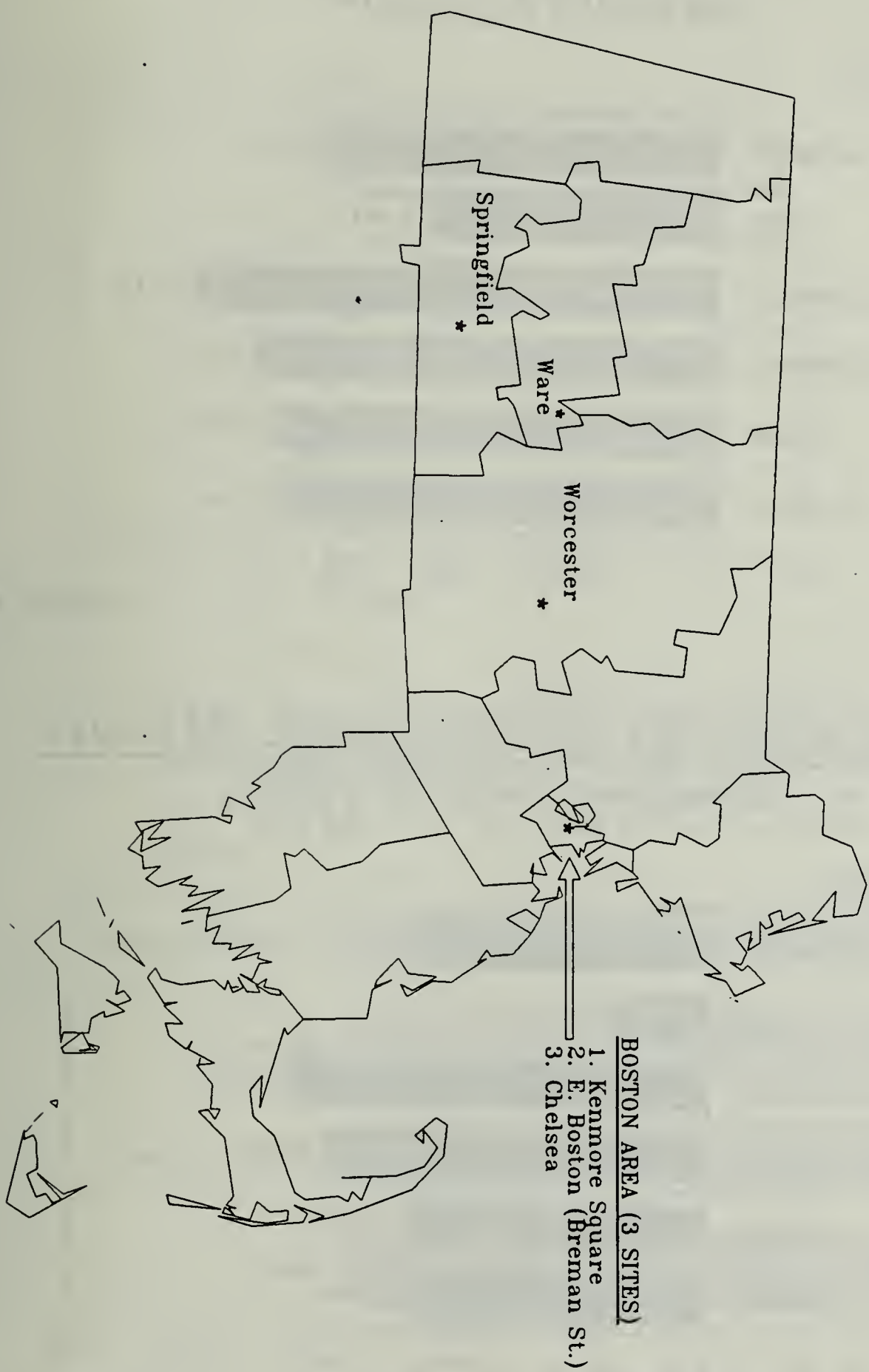
NITROGEN DIOXIDE (42602)					MASSACHUSETTS		UNITS: 007 PPM				ANNUAL ARITH MEAN
SITE ID	P O M C T CITY	CITY	COUNTY	ADDRESS	REP ORG	#OBS	MAX 1ST	1-HR 2ND	MAX 1ST	24-HR 2ND	
25-013-0016	1 2	SPRINGFIELD	HAMPDEN CO	LIBERTY STREET PARKING LOT	001	8673	.091	.087			.024
25-015-4002	1 2	WARE	HAMPSHIRE CO	QUABBIN SUMMIT	001	8447	.064	.064			.008
25-025-0002	1 3	BOSTON	SUFFOLK CO	KENMORE SQUARE	001	8372	.114	.112			.033
25-025-0021	1 1	BOSTON	SUFFOLK CO	340 BREMAN STREET	001	8511	.101	.101			.030
25-025-1003	1 1	CHELSEA	SUFFOLK CO	POWDER HORN HILL	001	8615	.097	.094			.024
25-027-0020	1 2	WORCESTER	WORCESTER CO	CENTRAL STREET	001	8488	.094	.093			.024

PRIMARY STANDARD: ANNUAL ARITHMETIC MEAN = 0.05 PPM
TO CONVERT UNITS FROM PPM TO $\mu\text{G}/\text{M}^3$ MULTIPLY PPM x 1886.1

ABBREVIATIONS AND SYMBOLS USED IN TABLE 15

SITE ID = AIRS SITE IDENTIFICATION NUMBER POC = PARAMETER OCCURENCE CODE (DIFFERENTIATES BETWEEN MONITORS AT A SITE)
MT = MONITOR TYPE (1 = NAMS, 2 = SLAMS, 3 = OTHER) REP ORG = REPORTING ORGANIZATION #OBS = NUMBER OF HOUR OBSERVATIONS
MAX 1-HR 1ST 2ND = FIRST AND SECOND HIGHEST VALUE FOR TIME PERIOD INDICATED ANNUAL ARITH MEAN = ANNUAL ARITHMETIC MEAN
(STANDARD = 0.05 PPM)

1992 PUBLIC NO2 MONITORING NETWORK



N02 Maximum 1 Hour Values

Standard = None

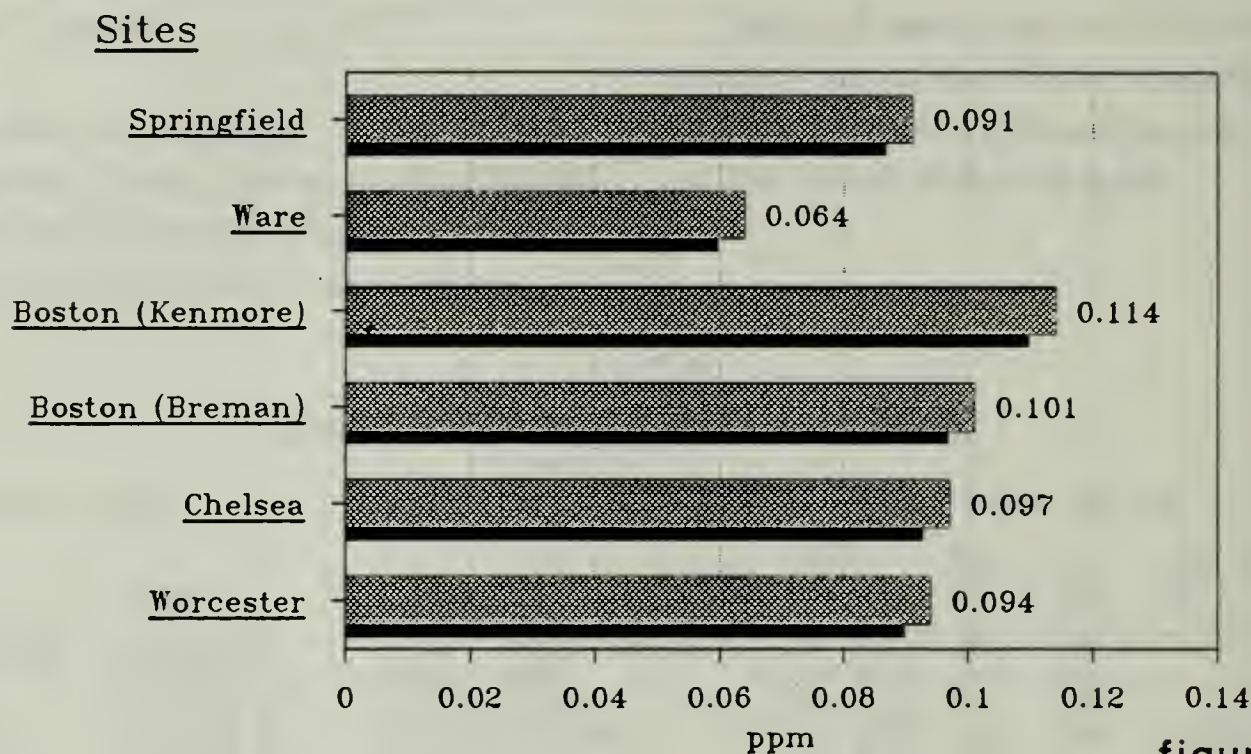


figure 14

N02 Annual Arithmetic Means

Standard = 0.05 ppm

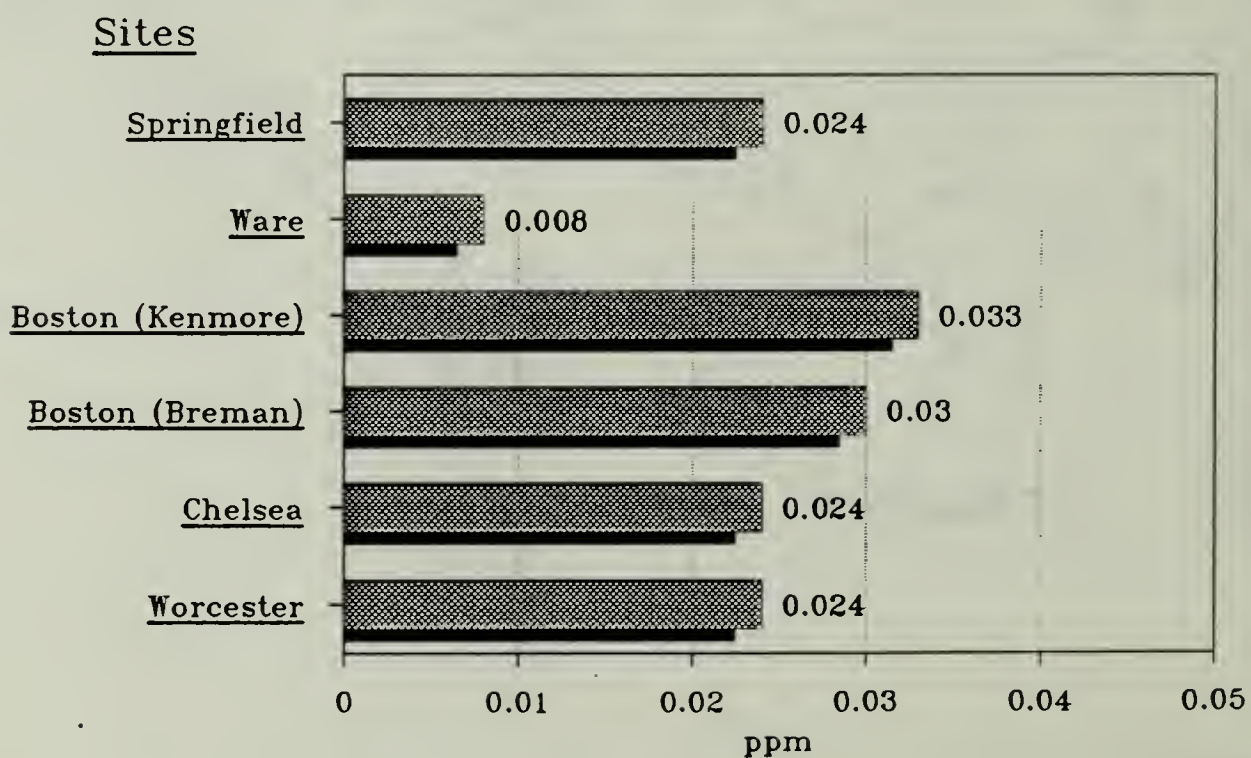


figure 15

N02 5-Year Trend Annual Arithmetic Mean Standard = 0.05 ppm

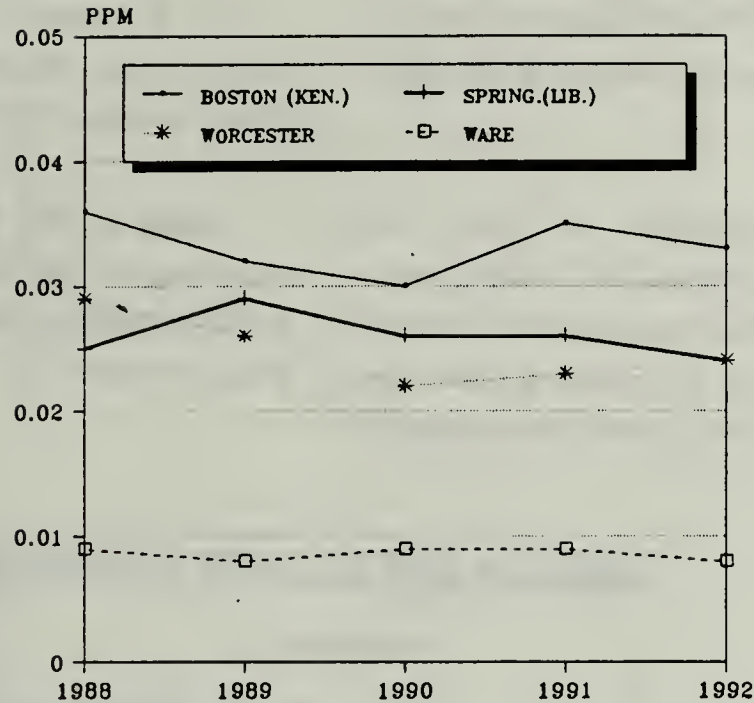


figure 16

1992 N02 FREQUENCY DISTRIBUTION

Percentile Rankings of 1-HR Values (PPM)

The meaning of the 90th percentile is 90% of the values are less than that value and 10% of the values are greater.

Sites

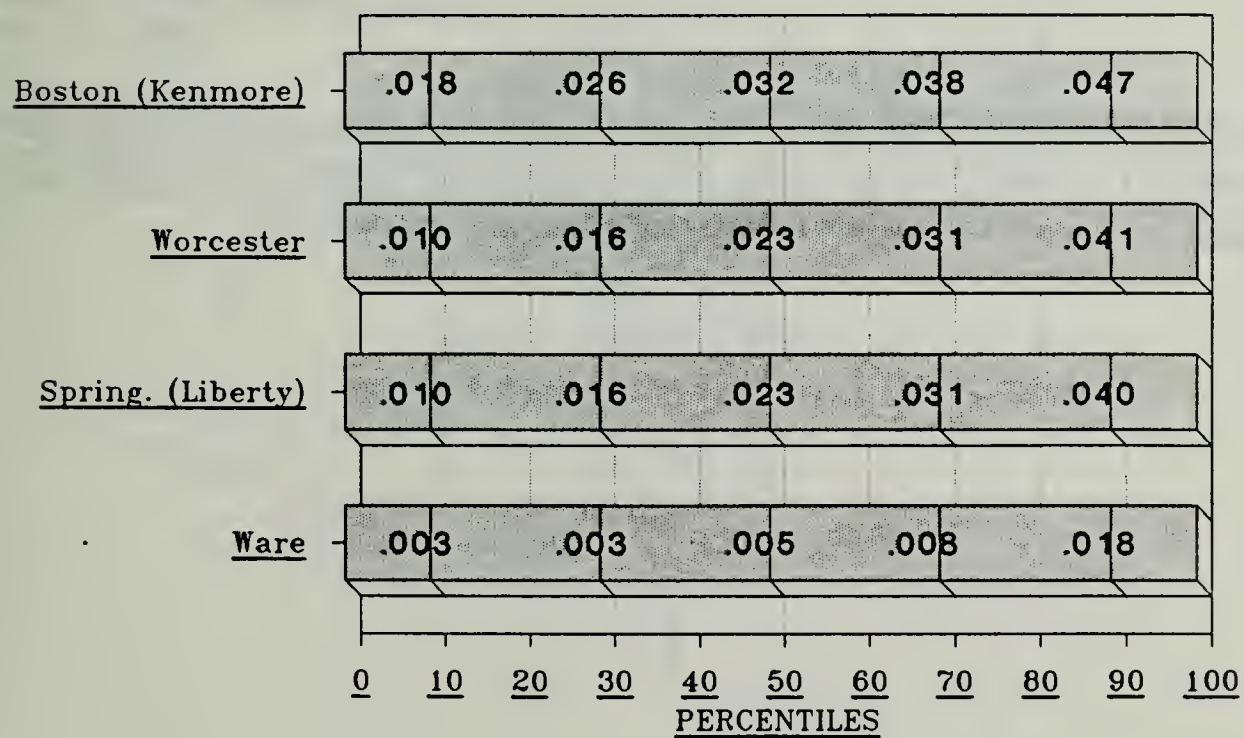


figure 17

3.5 CARBON MONOXIDE (CO) DATA SUMMARY

There were nine CO sites during 1992 in the state operated network. A new site was established in Worcester at Franklin and Grafton Streets during July. All of the sites achieved 75% or greater data capture. The CO data capture for all sites combined is shown in Section 3.10, figure 33 (pg 48).

The CO 8-hour standard (9 ppm) was exceeded at Worcester (Central St.) with a value of 9.7 ppm which is 108% of the standard. Section 2.2 (pg 17) contains more information about the exceedance. No other CO standards were exceeded

during the year. The highest 1-hour value was 20.6 ppm also at Worcester (Central St.) which is 59% of the standard.

CO is measured by an automated analyzer which takes samples continuously to provide hourly averaged values.

Table 16 lists by site the CO data for 1992 including the number of hour observations (100% is 8784), and the maximum values for 1-hour and 8-hour periods.

TABLE 16: 1992 CO DATA SUMMARY

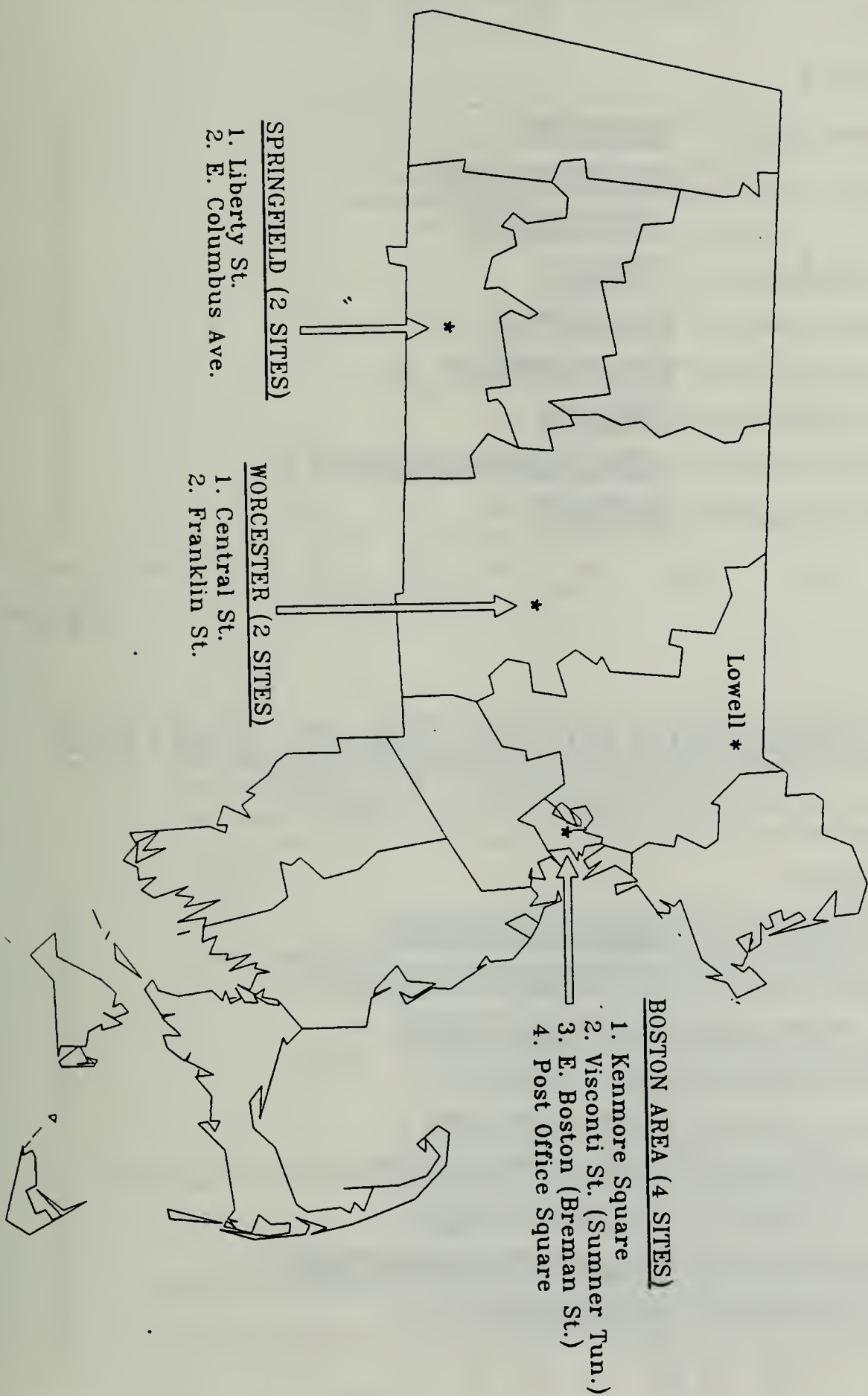
CARBON MONOXIDE (42101)				MASSACHUSETTS		UNITS: 007 PPM							
SITE ID	P O M		CITY	COUNTY	ADDRESS	REP ORG	#OBS	MAX 1-HR		OBS> 35	MAX 8-HR		OBS 9
	C	T						1ST	2ND		1ST	2ND	
25-013-0016	1	1	SPRINGFIELD	HAMPDEN CO	LIBERTY STREET	001	8660	9.2	8.3	0	7.1	6.9	
25-013-2007	1	1	SPRINGFIELD	HAMPDEN CO	EAST COLUMBUS AVENUE	001	8587	13.8	11.4	0	9.0	7.3	
25-017-0007	1	2	LOWELL	MIDDLESEX CO	MERRIMACK STREET	001	8073	12.1	11.4	0	6.9	5.9	
25-025-0002	1	2	BOSTON	SUFFOLK CO	KENMORE SQUARE	001	8666	7.9	7.4	0	5.0	4.2	
25-025-0016	1	2	BOSTON	SUFFOLK CO	VISCONTI ST. (SUMNER TUN)	001	8620	10.7	7.7	0	6.1	4.4	
25-025-0021	1	1	BOSTON	SUFFOLK CO	340 BREMAN STREET	001	8493	13.4	11.7	0	7.5	4.9	
25-025-0038	1	1	BOSTON	SUFFOLK CO	POST OFFICE SQUARE	001	8696	7.8	7.0	0	6.4	5.4	
25-027-0020	1	2	WORCESTER	WORCESTER CO	CENTRAL STREET	001	8708	20.6	17.0	0	9.7	8.0	
25-027-0022	1	2	WORCESTER	WORCESTER CO	FRANKLIN STREET	001	3726	8.3	7.1	0	4.8	4.5	

PRIMARY STANDARDS: 8-HOUR = 9 PPM
1-HOUR = 35 PPM

ABBREVIATIONS AND SYMBOLS USED IN TABLE 16

SITE ID = AIRS SITE IDENTIFICATION NUMBER POC = PARAMETER OCCURENCE CODE (DIFFERENTIATES BETWEEN MONITORS AT A SITE)
MT = MONITOR TYPE (1 = NAMS, 2 = SLAMS, 3 = OTHER) REP ORG = REPORTING ORGANIZATION #OBS = NUMBER OF HOUR OBSERVATIONS
MAX 1-HR 1ST 2ND = FIRST AND SECOND HIGHEST VALUE FOR TIME PERIOD INDICATED OBS > 35 = NUMBER OF 1-HR AVG. GREATER THAN 35 PPM (1-HR STANDARD) OBS > 9 = NUMBER OF 8-HR AVG. GREATER THAN 9 PPM (8-HR STANDARD)

1992 PUBLIC CO MONITORING NETWORK



CO Maximum 1 Hour Values

Standard = 35 ppm

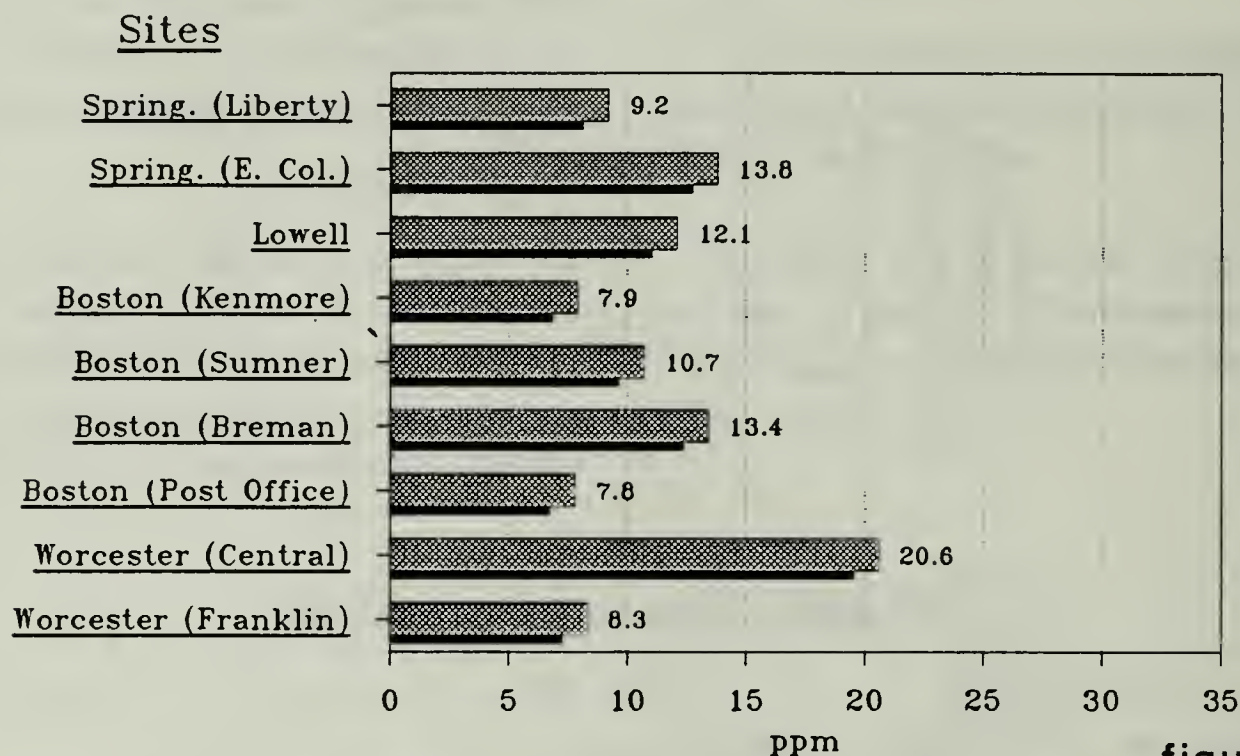


figure 18

CO Maximum 8 Hour Values

Standard = 9 ppm

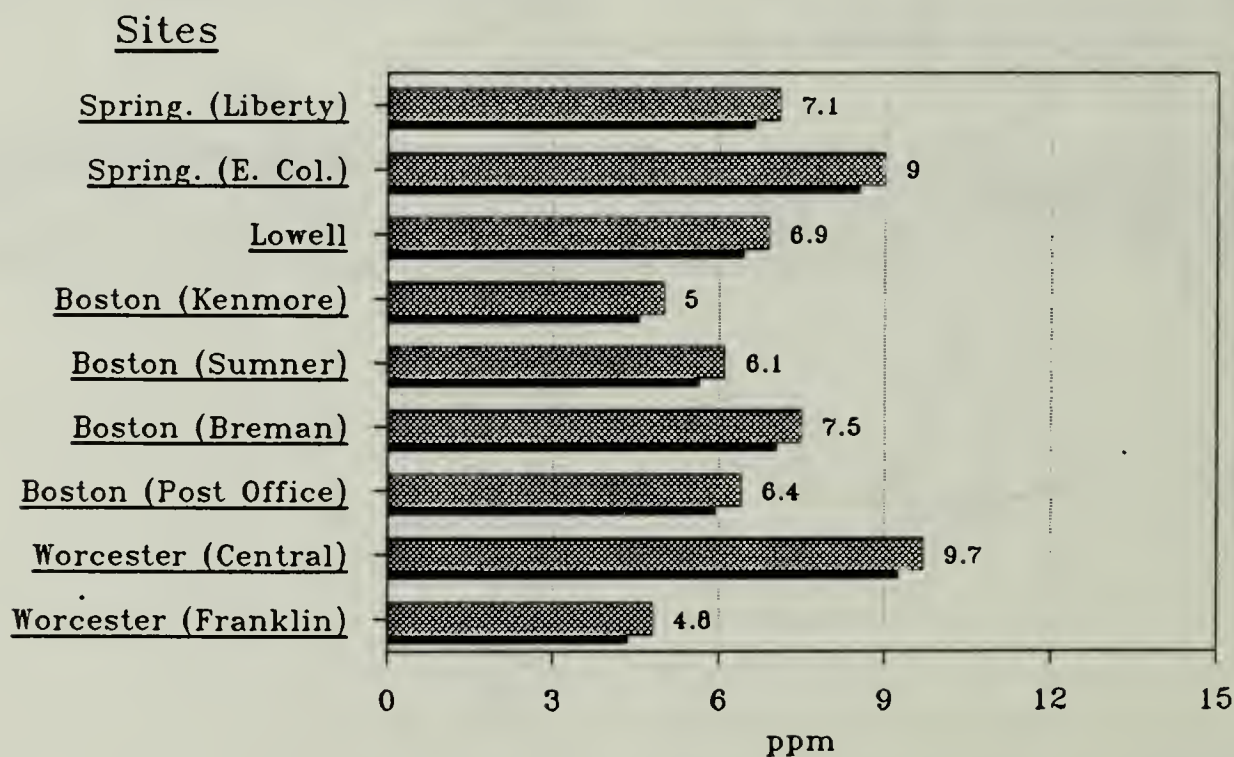


figure 19

CO 5-Year Trend

Maximum 8-Hour Values

Standard = 9 PPM

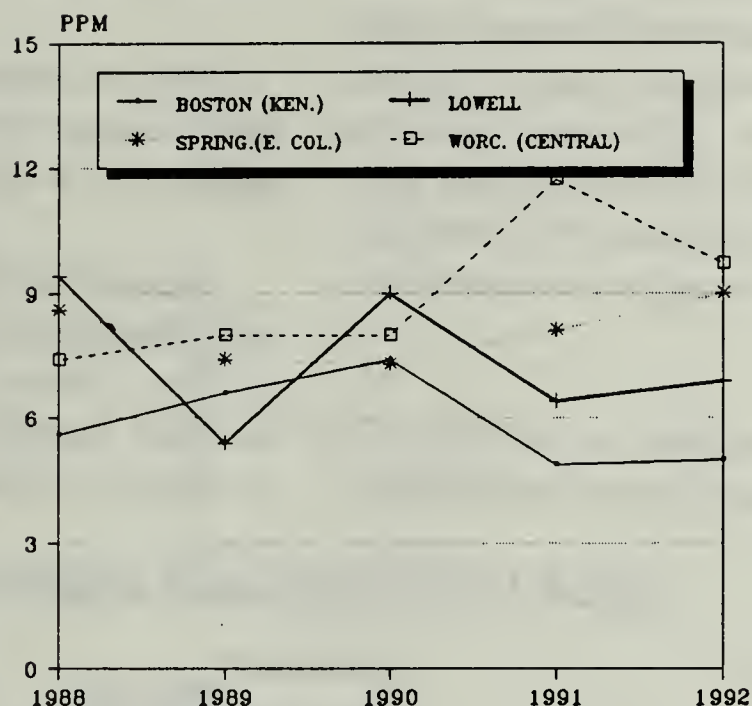


figure 20

1992 CO FREQUENCY DISTRIBUTION

Percentile Rankings of 1-HR Values (PPM)

The meaning of the 90th percentile is 90% of the values are less than that value and 10% of the values are greater.

Sites

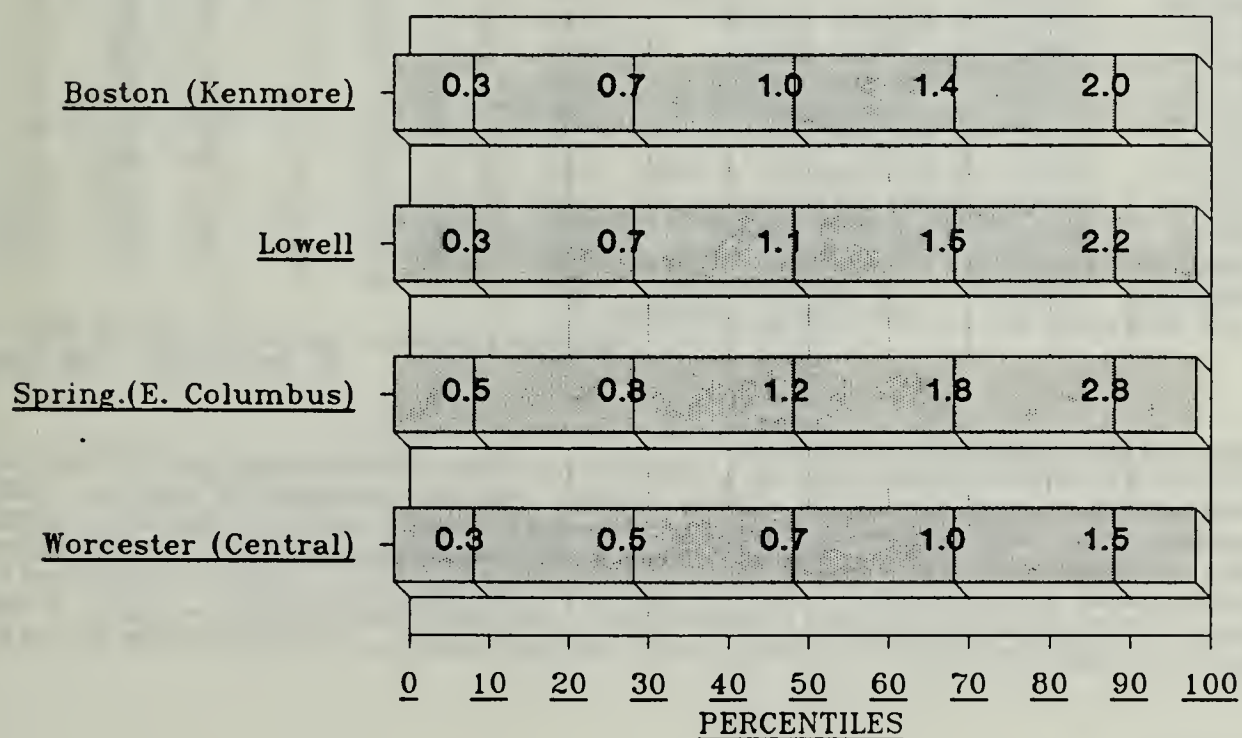


figure 21

3.6 PARTICULATE MATTER 10-MICRONS (PM10) DATA SUMMARY

There were seventeen PM10 sites during 1992 in the state operated network. Three sites had collocated samplers (samplers which operate simultaneously for precision assessment). Four out of the seventeen sites met the requirement of 75% data capture for each calendar quarter. The data loss was due both to a lab error and the temporary cessation of monitoring at sites while roof repair work was performed. The PM10 data capture for all sites combined is shown in Section 3.10, figure 34 (pg 48).

There were no violations of the PM10 air quality standards during the year. The highest 24-

hour value was 105 $\mu\text{g}/\text{m}^3$ at Springfield (East Columbus) which is 70% of the standard. The highest annual arithmetic mean was 33 $\mu\text{g}/\text{m}^3$ at Boston (City Sq.) which is 66% of the standard.

PM10 is measured by a manual sampler in which samples are collected during a 24 hour period on an every sixth day schedule.

Table 17 lists by site the PM10 data for 1992 including the number of observations (100% is 61; for Ware 100% is 122 because it samples at an increased frequency), the maximum values and the annual arithmetic mean.

TABLE 17: 1992 PM10 DATA SUMMARY

PM-10 TOTAL 0-10UM (81102)				MASSACHUSETTS					UNITS: 001 UG/CU METER (25 C)							ANN	
SITE ID	P	O M	C T CITY	COUNTY	ADDRESS	REP ORG	SCHEDULED				---MAX 24HR		VALUES---		VALS > 150	ARI ME	
							NUM OBS	NUM OBS	% OBS	NUM REQ	1ST	2ND	3RD	4TH	MEAS		EST
25-005-2004	1	2	NEW BEDFOR	BRISTOL CO	YMCA, 25 WATER STREET	001	57	57	93	61	45	42	38	34	0	0.00	
25-005-3001	1	2	FALL RIVER	BRISTOL CO	165 BEDFORD STREET	001	59	59	97	61	46	38	38	30	0	0.00	
25-009-0005	1	2	LAWRENCE	ESSEX CO	HIGH STREET	001	53	53	87	61	74	48	46	42	0	0.00	
25-013-0011	2	2	SPRINGFIEL	HAMPDEN CO	59 HOWARD STREET	001	48	47	79	61	43	43	39	37	0	0.00	
25-013-2007	1	1	SPRINGFIEL	HAMPDEN CO	EAST COLUMBUS AVENUE	001	56	56	92	61	80	69	64	61	0	0.00	
25-013-2007	3	3	SPRINGFIEL	HAMPDEN CO	EAST COLUMBUS AVENUE	001	48	48	79	61	81	71	59	48	0	0.00	
25-013-5003	1	2	W. SPRING.	HAMPDEN CO	VAN DEENE STREET	001	54	53	89	61	76	75	39	32	0	0.00	
25-015-4002	1	2	WARE	HAMPSHIRE	QUABBIN SUMMIT	001	93	91	76	122	37	37	35	34	0	0.00	
25-017-1801	1	2	SUDBURY	MIDDLESEX	WATER ROW RD.	001	58	58	95	61	62	61	32	31	0	0.00	
25-017-3002	1	2	MEDFORD	MIDDLESEX	100 TO 120 MAIN ST.	001	50	50	82	61	76	47	39	37	0	0.00	
25-021-0007	1	2	QUINCY	NORFOLK CO	HANCOCK STREET	001	59	59	97	61	39	36	35	28	0	0.00	
25-025-0002	1	1	BOSTON	SUFFOLK CO	KENMORE SQUARE	001	52	51	84	61	78	69	69	47	0	0.00	
25-025-0012	1	1	BOSTON	SUFFOLK CO	115 SOUTHAMPTON ST.	001	47	47	77	61	68	54	47	36	0	0.00	
25-025-0012	2	3	BOSTON	SUFFOLK CO	115 SOUTHAMPTON ST.	001	42	42	69	61	66	45	35	34	0	0.00	
25-025-0021	1	2	BOSTON	SUFFOLK CO	340 BREMAN STREET	001	51	51	84	61	82	46	46	44	0	0.00	
25-025-0024	1	1	BOSTON	SUFFOLK CO	200 COLUMBUS AVENUE	001	52	52	84	61	77	46	44	40	0	0.00	
25-025-0027	1	1	BOSTON	SUFFOLK CO	ONE CITY SQUARE	001	37	37	61	61	73	56	52	48	0	0.00	
25-025-0027	3	3	BOSTON	SUFFOLK CO	ONE CITY SQUARE	001	33	33	54	61	88	50	49	48	0	0.00	
25-027-0013	1	2	WORCESTER	WORCESTER	BELMONT ST.; UMASS	001	39	38	64	61	39	37	33	31	0	0.00	
25-027-0016	1	1	WORCESTER	WORCESTER	YUCA-WASHINGTON ST.	001	24	24	39	61	57	49	47	36	0	0.00	
? INDICATES THAT THE MEAN DOES NOT SATISFY SUMMARY CRITERIA																	

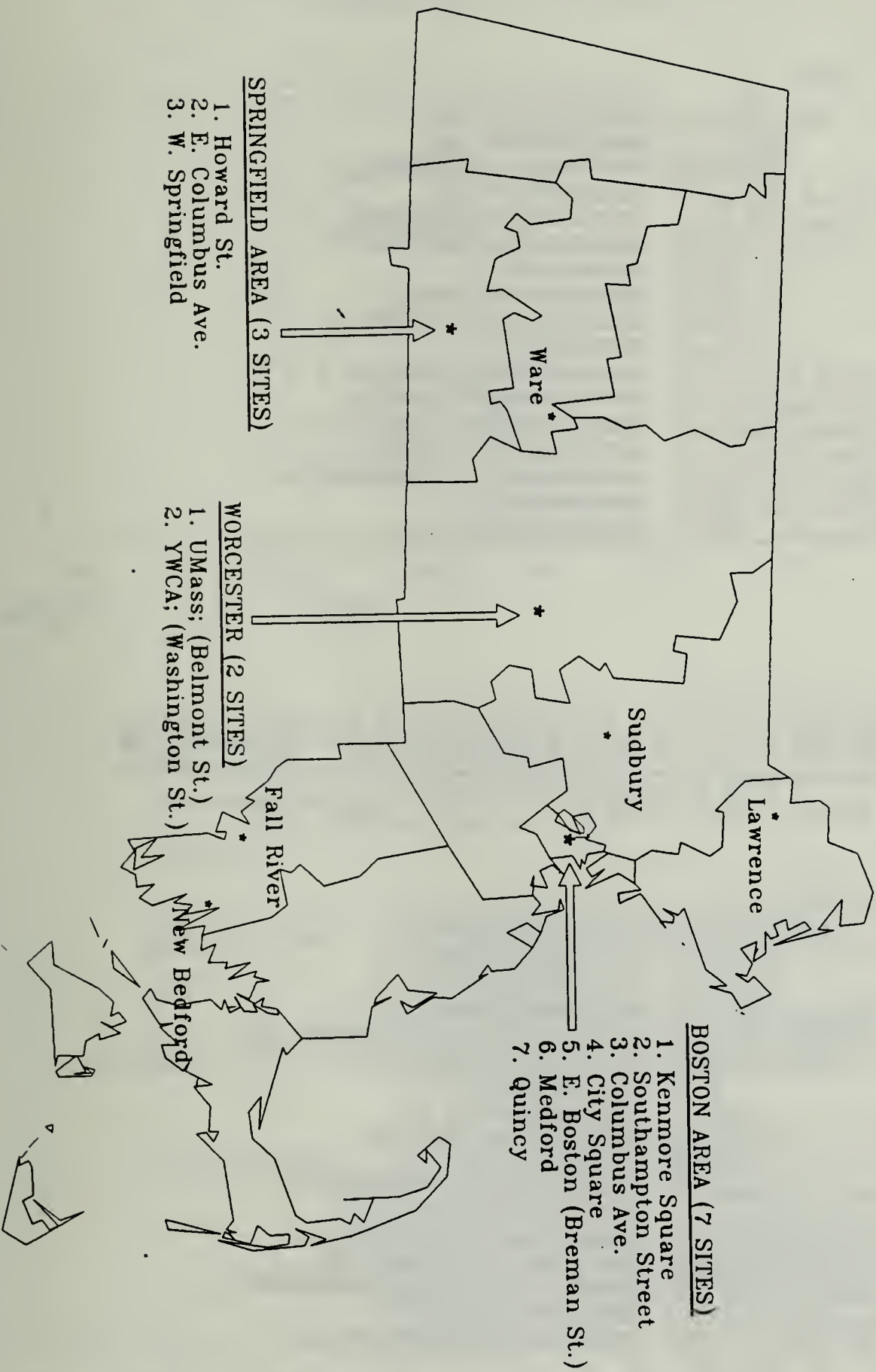
? INDICATES THAT THE MEAN DOES NOT SATISFY SUMMARY CRITERIA

PRIMARY STANDARDS: ANNUAL ARITHMETIC MEAN = 50 $\mu\text{g}/\text{m}^3$
24-HOUR VALUE = 150 $\mu\text{g}/\text{m}^3$

ABBREVIATIONS AND SYMBOLS USED IN TABLE 17

SITE ID = AIRS SITE IDENTIFICATION NUMBER POC = PARAMETER OCCURRENCE CODE (DIFFERENTIATES BETWEEN MONITORS AT A SITE)
MT = MONITOR TYPE (1 = NAMS, 2 = SLAMS, 3 = OTHER) REP ORG = REPORTING ORGANIZATION NUM OBS = NUMBER OF OBSERVATIONS
SCHEDULED NUM OBS = NUMBER OF OBSERVATIONS SCHEDULED % OBS = PERCENT COMPLETED OBSERVATIONS (BASED ON NUMBER REQUIRED)
NUM REQ = THE NUMBER OF OBSERVATIONS REQUIRED FOR 100% MAX 24HR VALUES 1ST,2ND,3RD,4TH = 1ST,2ND,3RD AND 4TH HIGHEST 24-HOUR
VALUES FOR THE YEAR VALS > 150 MEAS = NUMBER OF VALUES GREATER THAN 150 $\mu\text{g}/\text{m}^3$ (PM10 STANDARD) VALS > 150 EST = NUMBER OF
EXPECTED VIOLATIONS ANNUAL ARITH MEAN = WEIGHTED ANNUAL ARITHMETIC MEAN (STANDARD = 50 $\mu\text{g}/\text{m}^3$) ? = INDICATES THAT NUMBER
OF OBSERVATIONS WERE INSUFFICIENT TO CALCULATE MEAN. THE DATA CAPTURE AT A SITE MUST EXCEED 75% FOR EACH QUARTER.

1992 PUBLIC PM10 MONITORING NETWORK



PM10 Maximum 24 Hour Values

Standard = 150 ug/m³

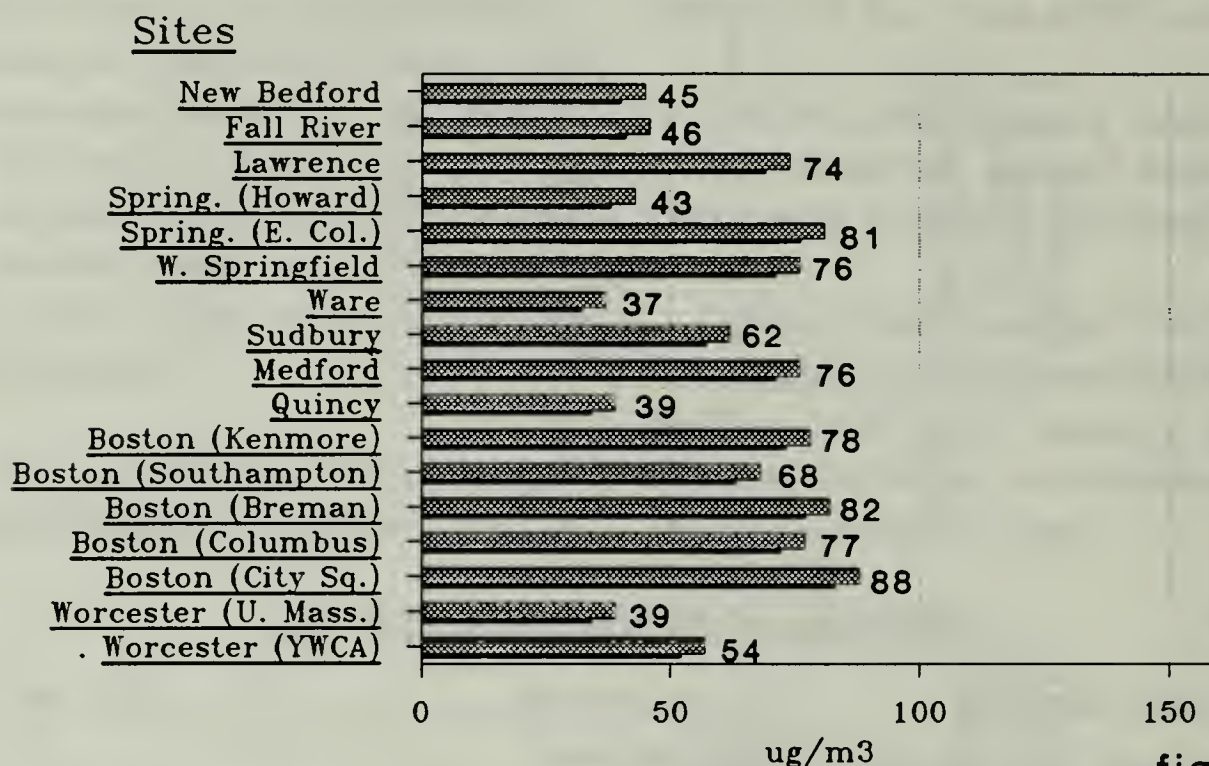


figure 22

PM10 Arithmetic Means

Standard = 50 ug/m³

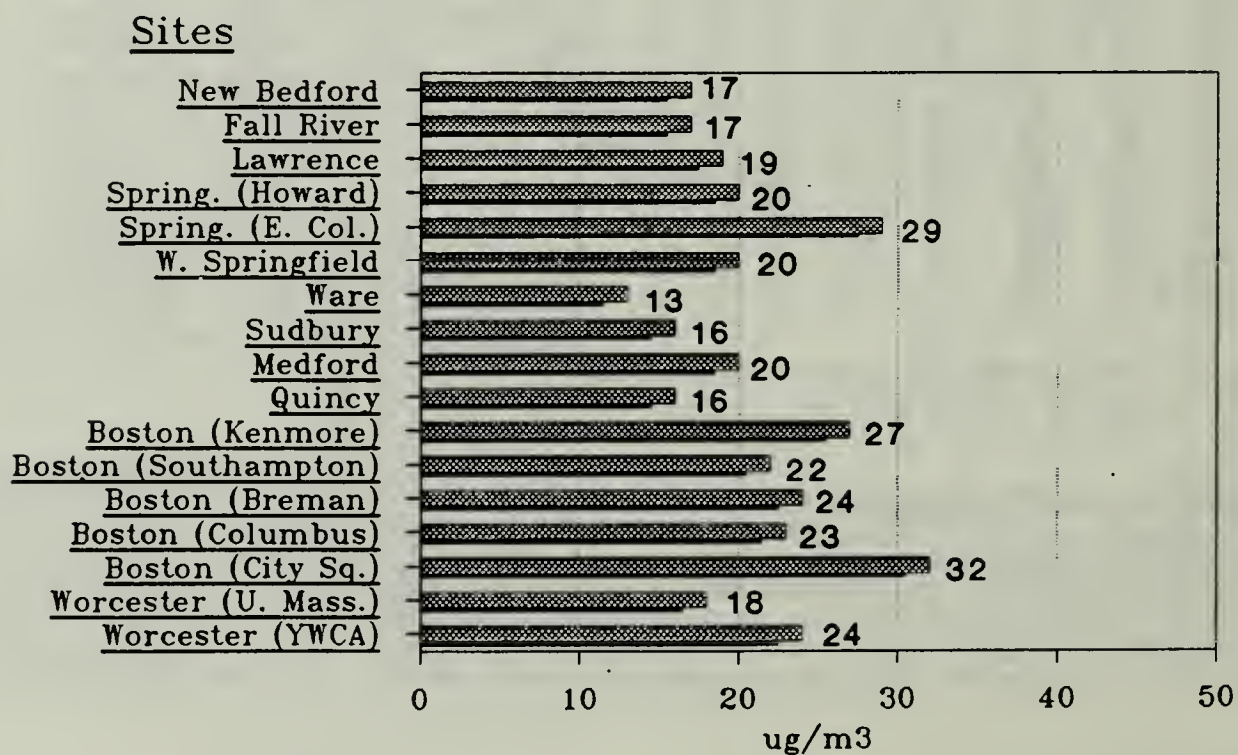


figure 23

PM10 5-Year Trend

Annual Arithmetic Mean

Standard = 50 ug/m3

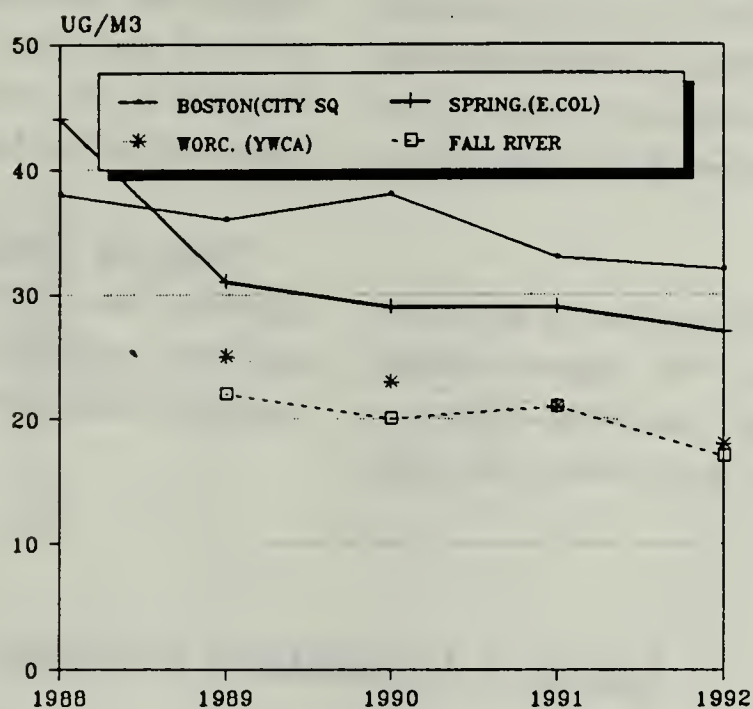


figure 24

1992 PM10 FREQUENCY DISTRIBUTION

Percentile Ranks of 24-HR Values (UG/M3)

The meaning of the 90th percentile is 90% of the values are less than that value and 10% of the values are greater.

Sites

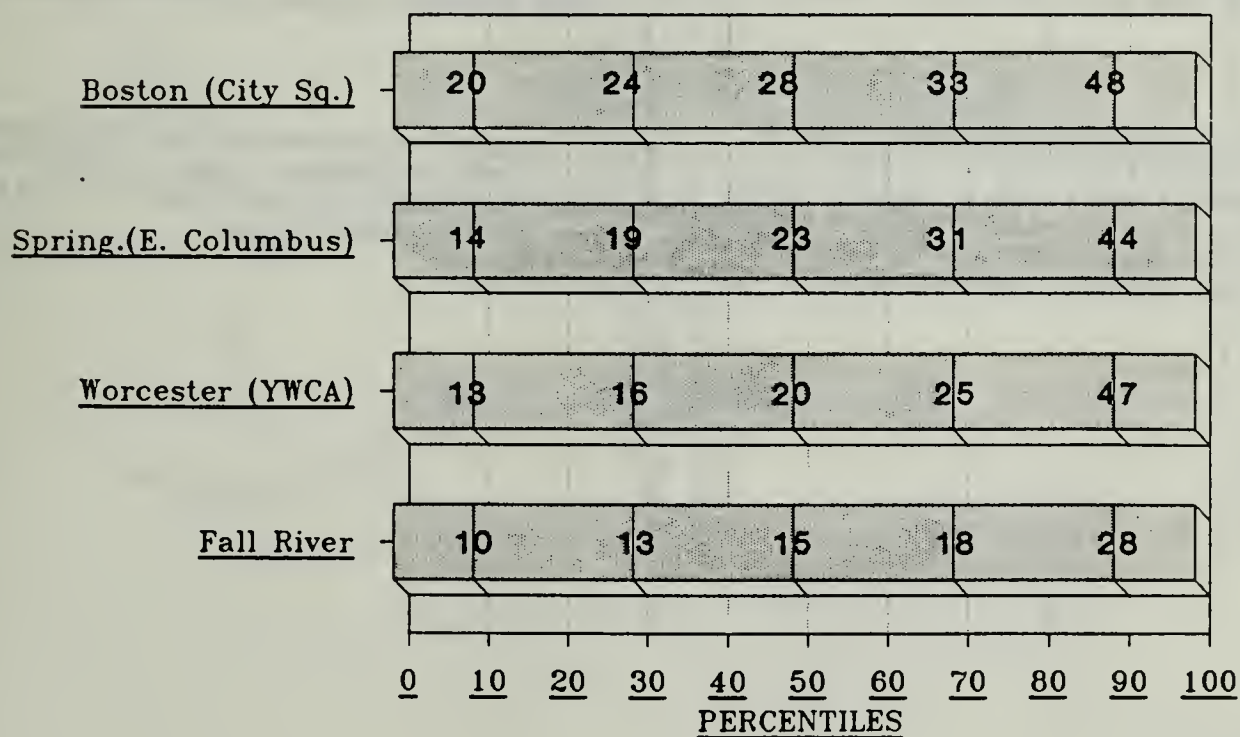


figure 25

3.7 LEAD (Pb) DATA SUMMARY

There were four Pb sites during 1992 in the state operated network. Two sites had collocated samplers (samplers which run simultaneously for precision assessment). Three out of the four sites met the requirement of 75% data capture for each calendar quarter. The Pb data capture for all sites combined is shown in section 3.10, figure 35 (pg 49).

There were no violations of the Pb air quality standard during the year. The highest calendar quarter arithmetic mean was $0.05 \mu\text{g}/\text{m}^3$ at Springfield (E. Columbus Ave.) which is 3% of the

standard.

Pb is measured by a manual sampler in which samples are collected during a 24 hour period on an every sixth day schedule. The samples are analyzed for Pb concentration by the Inorganic Chemistry Lab at Lawrence Experiment Station.

Table 18 lists by site the Pb data for 1992 including the number of observations (100% is 61), the quarterly arithmetic means and the maximum daily values.

TABLE 18: 1992 PB DATA SUMMARY

LEAD (12128)				MASSACHUSETTS				UNITS: 001 UG/CU METER (25 C)						
P														
O M														
SITE ID	C	T	CITY	COUNTY	ADDRESS	REP ORG	#OBS	----QUARTERLY 1ST	ARITH 2ND	MEANS 3RD	---- 4TH	MEANS >1.5	MAX 1ST	VALUES 2ND
25-013-0011	2	1	SPRINGFIELD	HAMPDEN CO	59 HOWARD STREET	001	58	.01	.03	.01	.00	0	.10	.07
25-013-0011	3	3	SPRINGFIELD	HAMPDEN CO	59 HOWARD STREET	001	46	.01	.02	.00	.00?	0	.07	.06
25-013-2007	1	1	SPRINGFIELD	HAMPDEN CO	EAST COLUMBUS AVE.	001	60	.02	.05	.03	.00	0	.11	.10
25-025-0002	1	1	BOSTON	SUFFOLK CO	KENMORE SQUARE	001	57	.03	.03	.02	.00	0	.07	.07
25-025-0027	2	1	BOSTON	SUFFOLK CO	ONE CITY SQUARE	001	41	.01	.03	.01?		0	.07	.06
25-025-0027	3	3	BOSTON	SUFFOLK CO	ONE CITY SQUARE	001	41	.01	.03	.01?		0	.09	.08
? INDICATES THAT THE MEAN DOES NOT SATISFY SUMMARY CRITERIA														

? INDICATES THAT THE MEAN DOES NOT SATISFY SUMMARY CRITERIA

PRIMARY STANDARD: CALENDER QUARTER ARITHMETIC MEAN = $1.5 \mu\text{g}/\text{m}^3$

ABBREVIATIONS AND SYMBOLS USED IN TABLE 18

SITE ID = AIRS SITE IDENTIFICATION NUMBER POC = PARAMETER OCCURRENCE CODE (DIFFERENTIATES BETWEEN MONITORS AT A SITE)

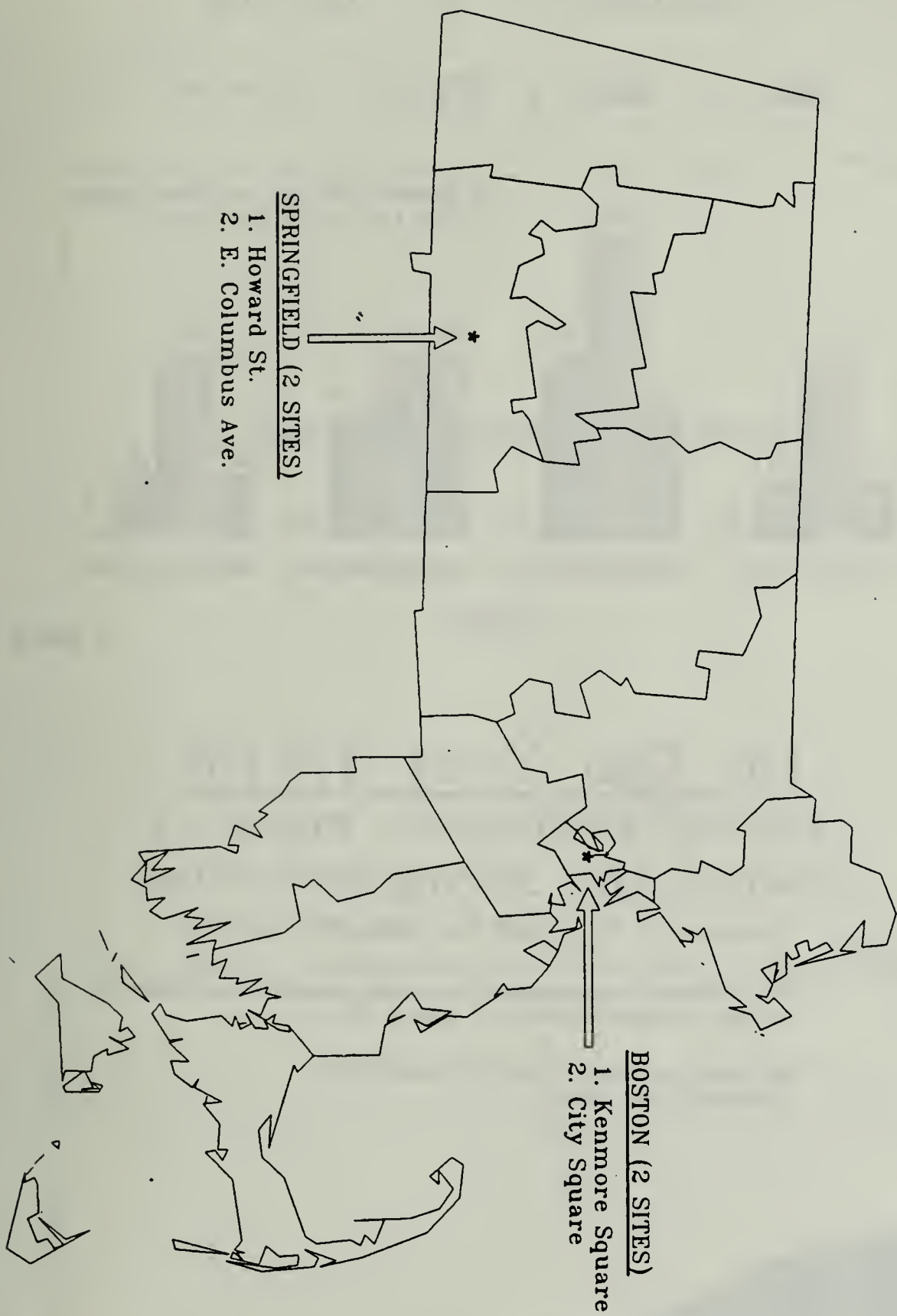
MT = MONITOR TYPE (1 = NAMS, 2 = SLAMS, 3 = OTHER) REP ORG = REPORTING ORGANIZATION # OBS = NUMBER OF OBSERVATIONS

QUARTERLY ARITH MEANS 1ST,2ND,3RD,4TH = 1ST,2ND,3RD AND 4TH QUARTER ARITHMETIC MEANS (STANDARD = $1.5 \mu\text{g}/\text{m}^3$)

MEANS > 1.5 = NUMBER OF QUARTERLY ARITHMETIC MEANS GREATER THAN $1.5 \mu\text{g}/\text{m}^3$ (PB STANDARD)

MAX VALUES 1ST,2ND = 1ST AND 2ND HIGHEST 24-HOUR VALUES FOR THE YEAR

1992 PUBLIC PB MONITORING NETWORK



Pb Quarterly Arithmetic Means

Standard = 1.5 ug/m³

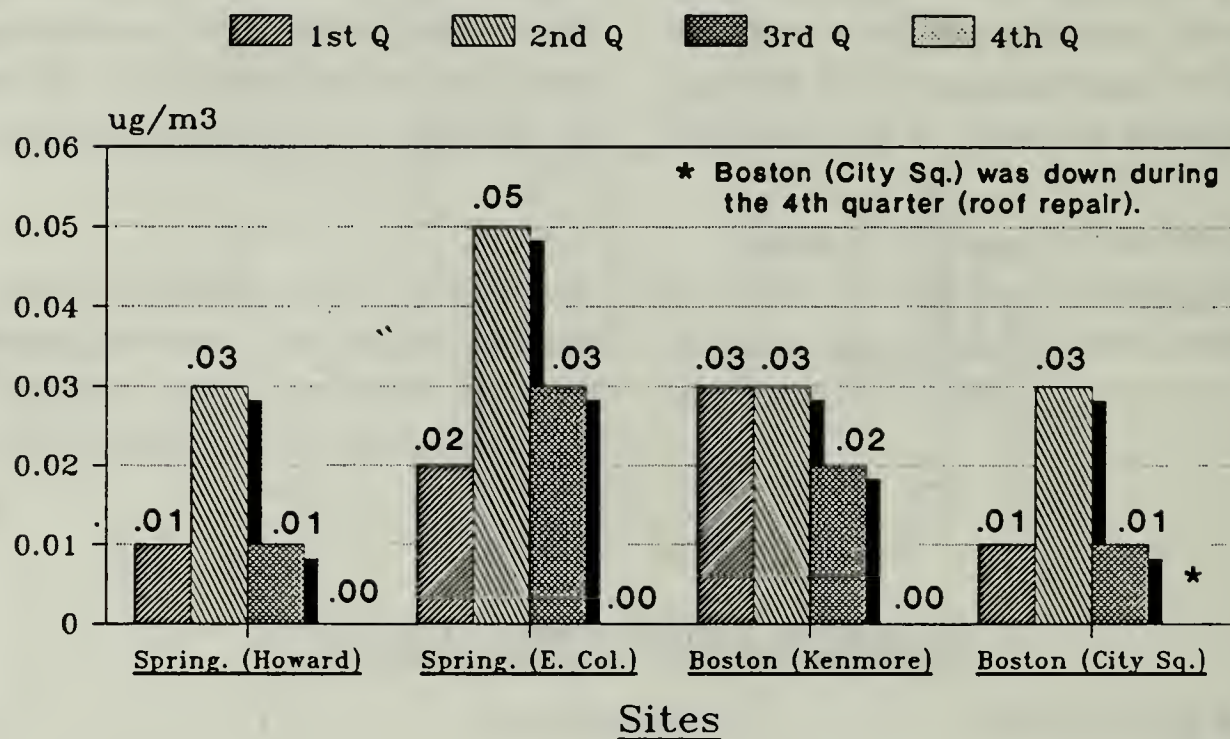
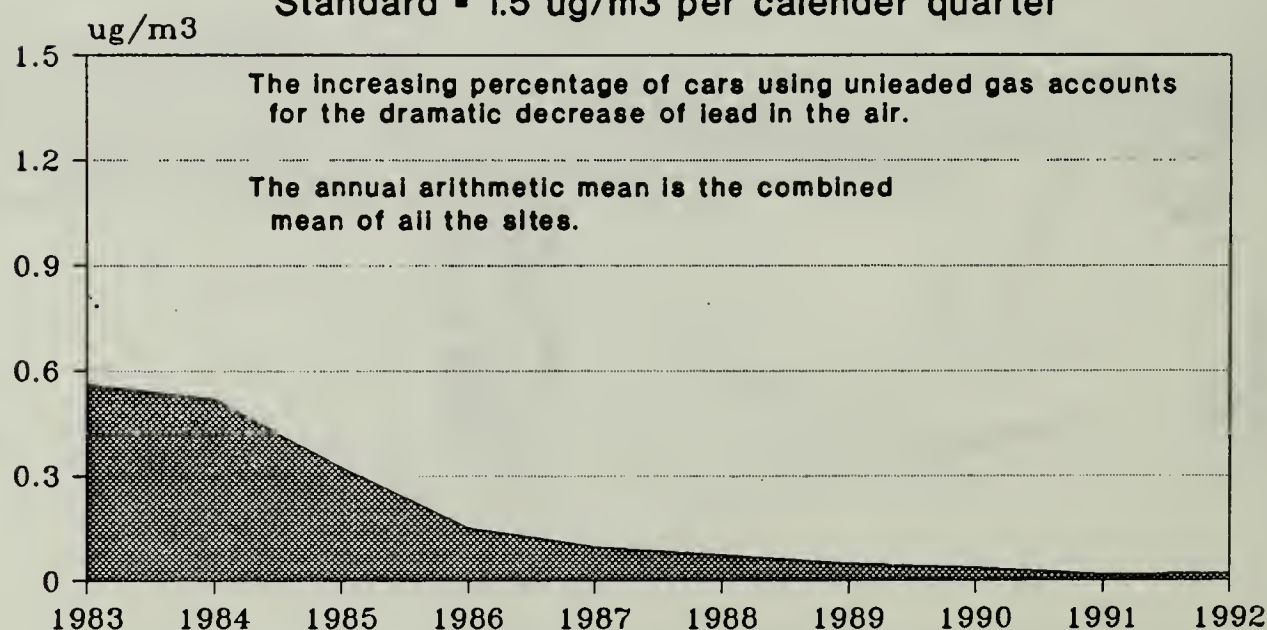


figure 26

Pb Ten Year Trend

Annual arithmetic mean of Boston and Springfield sites

Standard = 1.5 ug/m³ per calendar quarter



Sites are Howard + E. Columbus (Spring.)
and Kenmore + City Sq. (Boston)

figure 27

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3.8 TOTAL SUSPENDED PARTICULATE (TSP) DATA SUMMARY

TSP was replaced by PM10 as the particulate air quality standard effective July 31, 1987, and is no longer a criteria pollutant. PM10 was made the particulate standard because it collects particulates which are 10 microns or less. The smaller particulates are more likely to be a health hazard because they can penetrate the respiratory system.

TSP sampling was conducted at six sites during 1992. Two sites (Chelsea and Boston - Southampton St.) were shutdown during the year.

TSP sampling is maintained at the existing sites because the samples are used for determining lead (Pb) concentrations. The National Particulate Network (NPN), for which

EPA did metals analysis, was discontinued during 1992.

The former 24-hour standard ($150 \mu\text{g}/\text{m}^3$) was exceeded at three sites (Boston - Kenmore Sq. and City Sq.; Springfield - E. Columbus Ave.). However, PM10 samplers at these sites did not exceed the air quality standard.

TSP is measured by a manual sampler in which samples are collected during a 24 hour period on an every sixth day schedule.

Table 19 lists by site the TSP data for 1992 including the number of observations (100% is 61), the maximum values and the and geometric means.

TABLE 19: 1992 TSP DATA SUMMARY

TOTAL SUSPENDED PARTICULATE (11101)						MASSACHUSETTS		UNITS: 001 UG/CU METER (25 C)						
SITE ID	P O M		CITY	COUNTY	ADDRESS	REP ORG	#OBS	--MAXIMUM 24-HR VALUES--				ARITH MEAN	GEO MEAN	GEO ST
	C	T						1ST	2ND	3RD	4TH			
25-013-0011	1	2	SPRINGFIELD	HAMPDEN CO	59 HOWARD STREET	001	58	122	84	70	64	38	35	1.
25-013-0011	2	3	SPRINGFIELD	HAMPDEN CO	59 HOWARD STREET	001	45	138	82	58	56	38?	35?	1.
25-013-2007	1	3	SPRINGFIELD	HAMPDEN CO	EAST COLUMBUS AVE.	001	60	161	159	135	122	62	53	1.
25-025-0002	1	3	BOSTON	SUFFOLK CO	KENMORE SQUARE	001	57	279	129	124	106	71	65	1.
25-025-0012	1	2	BOSTON	SUFFOLK CO	115 SOUTHAMPTON ST.	001	43	142	123	110	106	54?	49?	1.
25-025-0027	1	2	BOSTON	SUFFOLK CO	ONE CITY SQUARE	001	41	146	136	115	115	67?	61?	1.
25-025-0027	2	3	BOSTON	SUFFOLK CO	ONE CITY SQUARE	001	41	155	139	125	107	69?	62?	1.
25-025-1003	1	2	CHELSEA	SUFFOLK CO	POWDER HORN HILL	001	45	93	84	57	57	35?	33?	1.
? INDICATES THAT THE MEAN DOES NOT SATISFY SUMMARY CRITERIA														

? INDICATES THAT THE MEAN DOES NOT SATISFY SUMMARY CRITERIA

ABBREVIATIONS AND SYMBOLS USED IN TABLE 19

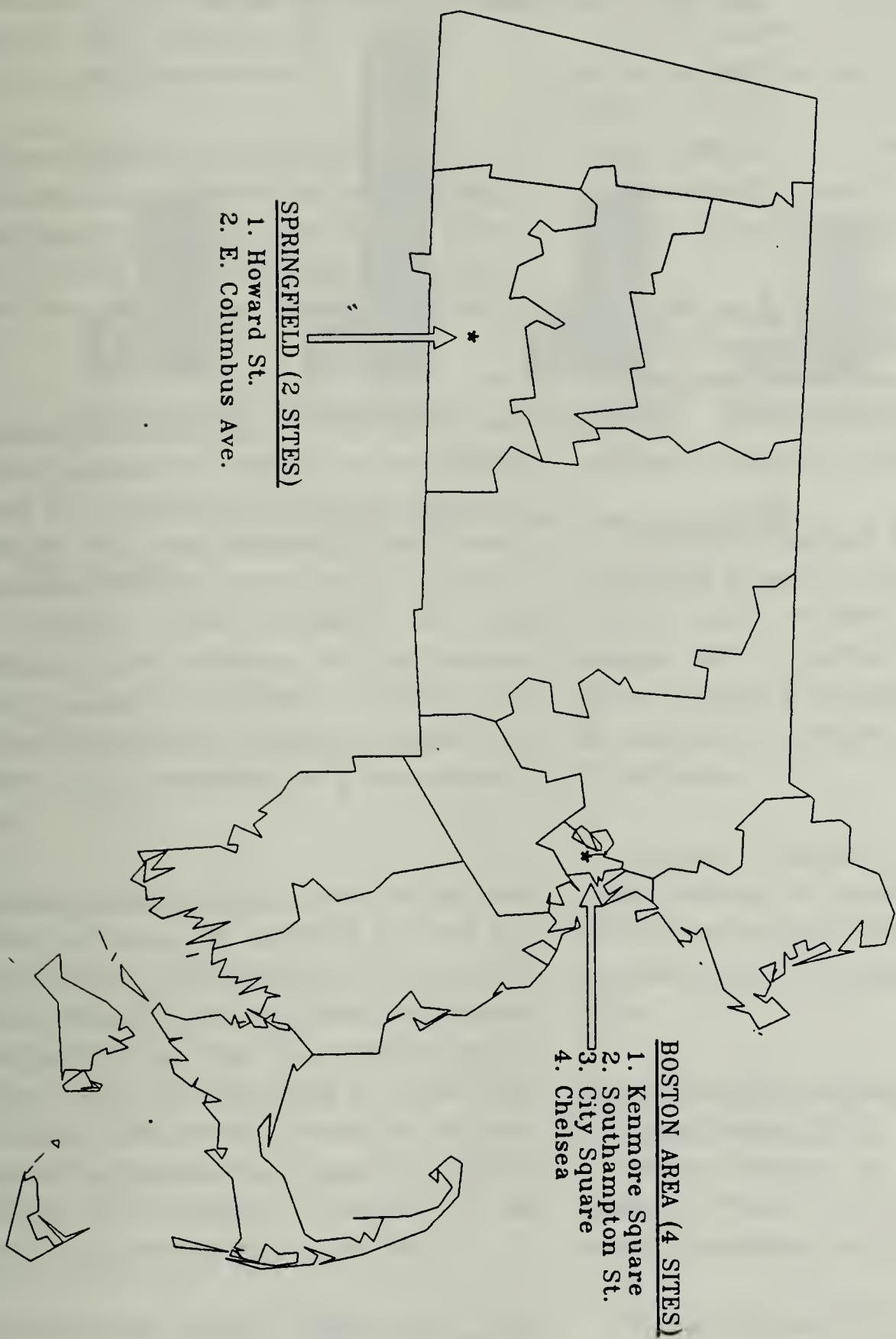
SITE ID = AIRS SITE IDENTIFICATION NUMBER POC = PARAMETER OCCURRENCE CODE (DIFFERENTIATES BETWEEN MONITORS AT A SITE)

MT = MONITOR TYPE (1 = NAMS, 2 = SLAMS, 3 = OTHER) REP ORG = REPORTING ORGANIZATION # OBS = NUMBER OF OBSERVATIONS

MAXIMUM VALUES 1ST,2ND,3RD,4TH = 1ST,2ND,3RD AND 4TH HIGHEST 24-HOUR VALUES FOR THE YEAR ARITH MEAN = ARITHMETIC MEAN

GEO MEAN = GEOMETRIC MEAN GEO STD = GEOMETRIC STANDARD DEVIATION

1992 PUBLIC TSP MONITORING NETWORK



TSP Data Summary

No Standards

*The former TSP standards were 150 ug/m³ (24 hours)
and 75 ug/m³ (annual geometric mean).*

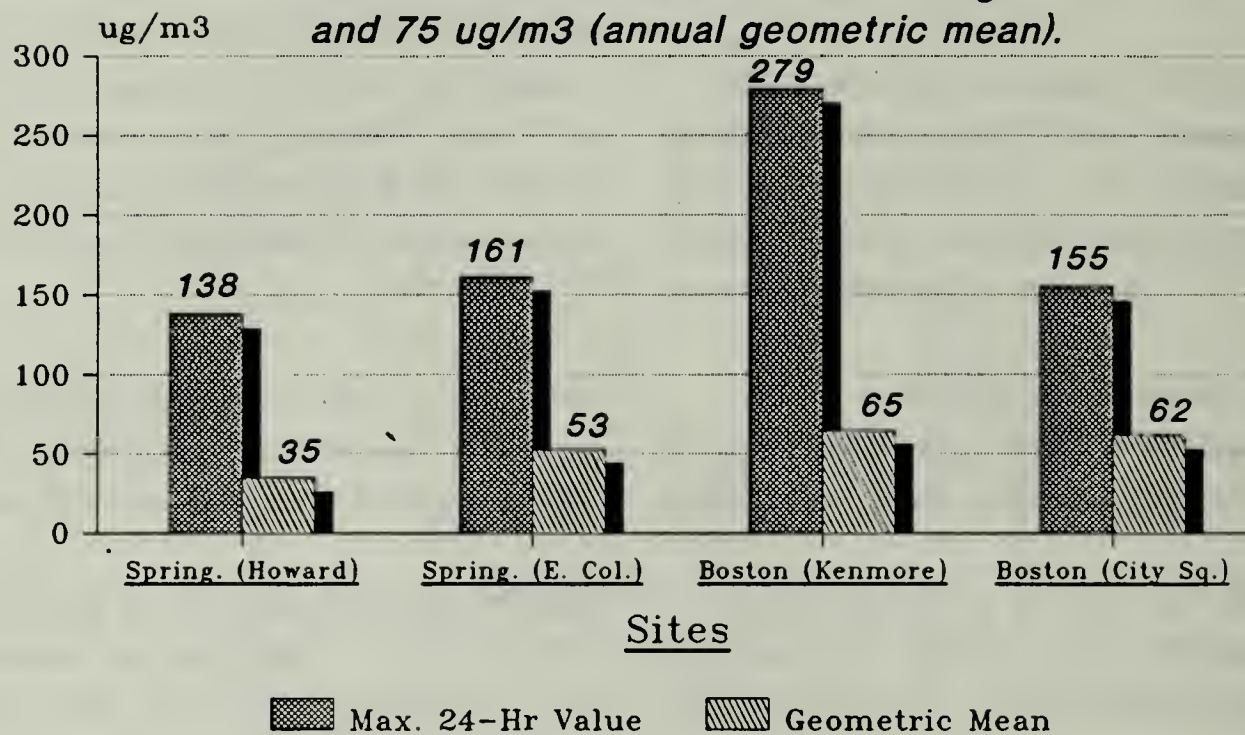


figure 28

3.9 QUALITY CONTROL AND QUALITY ASSURANCE

The standard operating procedures (SOPs) used to generate the data in this report include quality control (QC) and quality assurance (QA) techniques which document the precision and accuracy of the submitted data.

The requirements, techniques and goals of a QC/QA program are described in the U.S. Code of Federal Regulations (CFR), title 40, part 58 and in the U.S. EPA "Quality Assurance Handbook for Air Pollution Measurement Systems", Volumes 1 and 2.

Quality Control (QC) is comprised of those activities performed by personnel who are directly involved in the generation of the data. Examples of personnel who would perform QC functions are site operators and laboratory support personnel. QC activities include functions such as calibrations, data validation and performance checks to assess the precision of ambient air analyzers and samplers. Precision is defined as a measure of the repeatability of a measurement system.

Quality Assurance (QA) is comprised of those activities performed by personnel who are not directly involved in the generation of the data and who may therefore make an unbiased assessment of the quality of the data. QA activities include functions such as site inspections and conducting performance audit checks to assess the accuracy of ambient air analyzers and samplers. Accuracy is defined as a measure of closeness of an observed measurement value to the truth.

Requirements and Techniques for Performing Precision and Accuracy Checks

Precision and accuracy of air quality data cannot be determined by examining the data itself, but requires the use of specific operator and

auditor checks from which precision and accuracy can be assessed.

The requirements and techniques for performing precision and accuracy checks is set forth by the U.S. EPA as described in 40 CFR, Part 58, Appendix A. A condensed description of the requirements and techniques for performing precision and accuracy checks follows.

Precision and Accuracy for Automated Methods (continuous data)

Automated methods are used for monitoring pollutants (SO₂, NO₂, O₃, CO) for which continuous analyzers perform the measurement.

Precision is assessed by performing a one-point check at least once every two weeks. The precision check is made by challenging the analyzer with a known concentration of gas between 0.080 and 0.100 ppm for SO₂, NO₂ and O₃ analyzers, and between 8.0 and 10.0 ppm for CO analyzers.

Accuracy is assessed by performance audits which challenge the analyzer with audit gas of different concentration levels so that the analyzer response is tested throughout its measurement range.

Precision and Accuracy for Manual Methods (non-continuous data)

Manual methods are used for monitoring pollutants (PM₁₀, TSP and Pb) for which non-continuous samplers perform the measurement.

Precision is assessed by selecting one or more monitoring sites for collocated sampling. The collocated samplers run together during sampling periods. The measurements of each sampler are compared to calculate precision.

The accuracy of manual sampling methods is assessed by auditing a portion of the measurement process. For PM10 and TSP the flow-rate during sample collection is audited. For Pb the flow-rate and analytical method are both audited.

Calculation and Meaning of Precision and Accuracy Statistics

The analyzer and sampler percent differences obtained from QC and QA checks are used to assess the precision and accuracy of the data being generated in the sampling network. Precision and accuracy are given in the context of lower and upper 95 percentile limits. The calculated values for the lower and upper 95 percentile limits are given in units of percentage for each parameter.

The meaning of the 95 percentile limits is that 95% of the data obtained for each parameter is estimated to be precise and accurate to within the

percentage range defined by the lower and upper limits. As an example, if the lower and upper 95 percentile limits for a parameter based upon precision checks are calculated to be -7.4% and +4.3%, then 95% of the data for that parameter is precise to within the range of -7.4% through +4.3%.

95 Percentile Limit Goals

The QC/QA procedures are designed to obtain data which is of known and acceptable precision and accuracy. As a goal, the 95 percentile probability limits for precision (all parameters) and PM10 and TSP accuracy should be less than $\pm 15\%$. The 95 percentile probability limits for accuracy for all other parameters should be less than $\pm 20\%$.

The 1992 precision and accuracy data summary is listed in **Table 20** on the following page.

TABLE 20: 1992 PRECISION AND ACCURACY DATA

CONTINUOUS ANALYZERS					PRECISION DATA				ACCURACY DATA							
ION-ACCURACY DATA KEY	RO	TYP	POLL	YR-Q	# OF ANALYZERS	PRECIS CHECKS	PROB LIM LO	PROB LIM UP	LOC STD SOURCE	TYP AUD	# AUDITS L1-3 L4	PROB LIM LO-L1-UP	PROB LIM LO-L2-UP	PROB LIM LO-L3-UP		
001 C 42101 92					9	207	-05	+06			19	0 -04 +03	-04 +01	-06 +01		
MONOXIDE 92-1					8	49	-04	+05	A	1	4	0 -06 +00	-08 +01	-09 +00		
92-2					8	47	-05	+04	A	1	4	0 -05 +12	-02 +05	-05 +04		
92-3					8	51	-03	+03	A	1	3	0 -03 +02	-02 +01	-02 +00		
92-4					9	60	-03	+06	A	1	8	0 -05 +02	-06 +03	-09 +04		
001 C 42401 92					11	274	-10	+06			23	0 -11 +07	-10 +06	-09 +04		
DIOXIDE 92-1					11	68	-08	+06	A	1	5	0 -16 +08	-10 +08	-11 +09		
92-2					11	68	-10	+03	A	1	6	0 -06 +15	-06 +10	-07 +06		
92-3					11	66	-09	+03	A	1	5	0 -14 +00	-12 -03	-13 -02		
92-4					11	72	-06	+06	A	1	7	0 -09 +04	-10 +06	-10 +07		
001 C 42602 92					6	138	-15	+10			13	0 -13 +16	-09 +10	-09 +09		
GEN DIOXIDE 92-1					6	35	-12	+07	A	1	3	0 -09 +23	-06 +18	-04 +16		
92-2					6	33	-15	+07	A	1	3	0 -11 +05	-05 +04	-04 +03		
92-3					6	36	-16	+08	A	1	3	0 -22 +22	-15 +12	-17 +12		
92-4					6	34	-13	+11	A	1	4	0 -04 +20	-12 +16	-13 +14		
001 C 44201 92					16	260	-10	+06			38	0 -08 +05	-06 +02	-06 +02		
92-1					3	18	-06	+03	F	2	3	0 -07 +01	-03 +00	-04 +02		
92-2					16	90	-10	+06	F	2	14	0 -08 +07	-06 +04	-07 +04		
92-3					16	101	-09	+05	F	2	16	0 -10 +06	-09 +05	-10 +05		
92-4					16	51	-09	+06	F	2	5	0 -07 +04	-06 +03	-05 +04		

CONTINUOUS ANALYZERS					PRECISION DATA					ACCURACY DATA					
ION-ACCURACY DATA KEY	RO	TYP	POLL	YR-Q	# OF SMPLS	COLLC SITES	PROB LIM LO	PROB LIM UP	COLL SAMP BELOW LIM	VAL COLL DATA PRS	LOC STD SOURCE	TYP AUD	#AUDITS	PROB LIM LO-L1-UP	PROB LIM LO-L2-UP
001 I 11101 92					84	2	-08	+12	3	81	M	1	15		-02 +06
DED PARTICULAT 92-1					27	2	-09	+10	0	27	M	1	3		-11 +07
92-2					25	2	-09	+16	0	25	M	1	2		-04 -01
92-3					25	2	-05	+11	2	23	M	1	5		+01 +08
92-4					7	1	-05	+01	1	6	M	1	5		-02 +09
001 I 12128 92					85	2			85	0	X	1	6	-18 +07	-08 +06
(TSP) 92-1					27	2			27	0	X	1	3	-17 -03	-04 +06
92-2					26	2			26	0	X	1	1	+00 +00	-01 -01
92-3					25	2			25	0			0		
92-4					7	1			7	0	X	1	2	-16 +12	-10 +01
001 I 81102 92					122	3	-10	+14	59	63	M	1	43		-05 +04
TOTAL O-10UM 92-1					38	3	-09	+09	14	24	M	1	6		-07 +03
92-2					43	3	-08	+14	22	21	M	1	9		-08 +04
92-3					23	3	-15	+24	12	11	M	1	15		-05 +05
92-4					18	2	-07	+14	11	7	M	1	13		-06 +07

ABBREVIATIONS AND SYMBOLS USED IN TABLE 18:

RG = EPA REGION ST = STATE RO = REPORTING ORGANIZATION TYP = ANALYZER TYPE (CONTINUOUS OR NON-CONTINUOUS) YR = YEAR
 # OF ANALYZERS = NUMBER OF ANALYZERS PRECIS CHECKS = NUMBER OF PRECISION CHECKS PROB LIM LO/UP = LOWER AND UPPER
 95% PROBABILITY LIMITS LOC STD SOURCE = AUDIT GAS SOURCE TYP AUD = AUDIT TYPE (1 = DONE BY REPORT ORG) # AUDITS = NUMBER
 OF AUDITS PROB LIM LO-L1-UP = LOWER AND UPPER 95% PROBABILITY LIMITS AT LOW RANGE PROB LIM LO-L2-UP = LOWER AND UPPER 95%
 PROBABILITY LIMITS AT MIDDLE RANGE PROB LIM LO-L3-UP = LOWER AND UPPER 95% PROBABILITY LIMITS AT HIGH RANGE
 # OF SMPLS = NUMBER OF SAMPLERS COLLC SITES = NUMBER OF COLLOCATED SITES COLL SAMP BELOW LIM = NUMBER OF COLLOCATED
 SAMPLES BELOW THE LIMIT SET FOR PRECISION CALCULATION VAL COLL DATA PRS = NUMBER OF VALID COLLOCATED SAMPLES (ABOVE THE
 LIMIT USED FOR PRECISION CALCULATION)

PRECISION DATA: Acceptable lower and upper 95% probability limits are within $\pm 15\%$.

ACCURACY DATA: Acceptable lower and upper 95% probability limits are within $\pm 15\%$ for TSP, Pb and PM10. For CO, SO2, NO2 and O3 acceptable limits are within $\pm 20\%$.

1992 Precision Summary

Upper and lower 95% probability limits

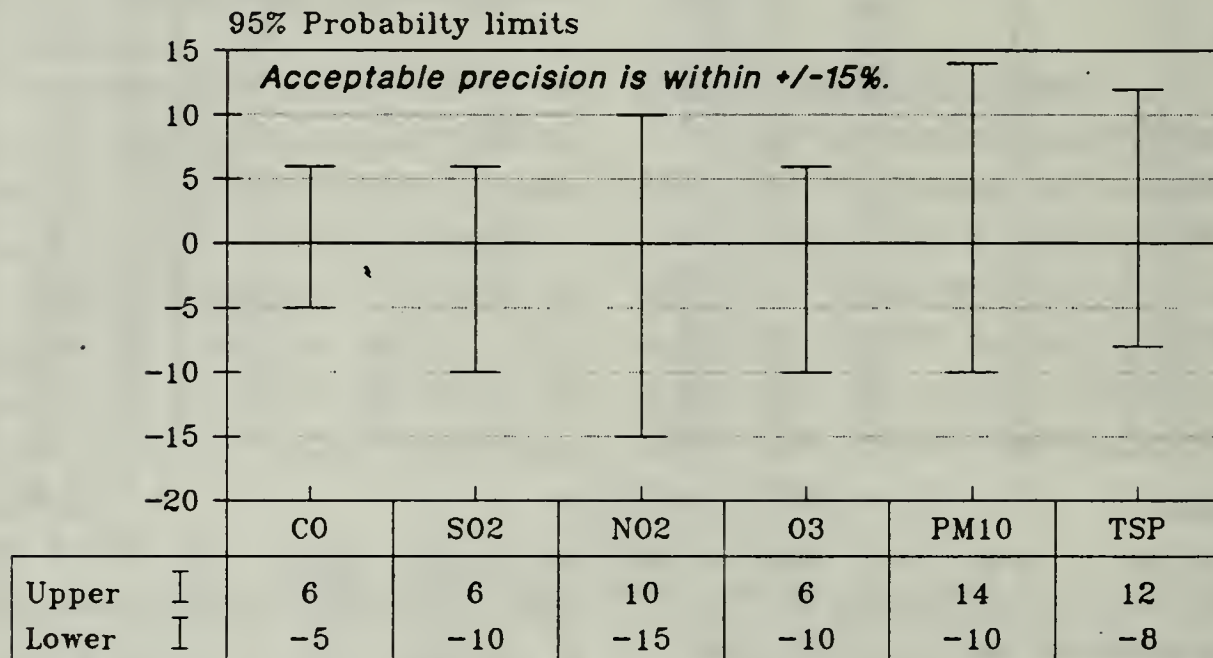


figure 29

1992 CO Accuracy Summary

Upper and lower 95% probability limits

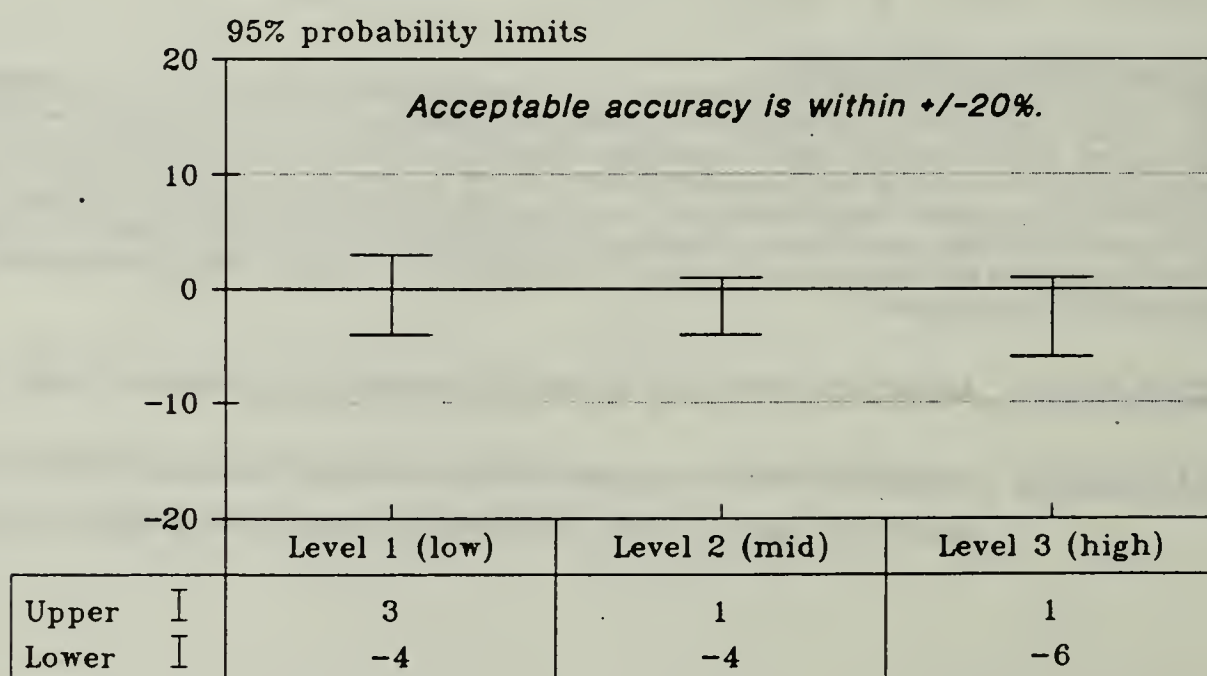


figure 30

1992 NO2 Accuracy Summary

*Upper and lower 95%
probability limits*

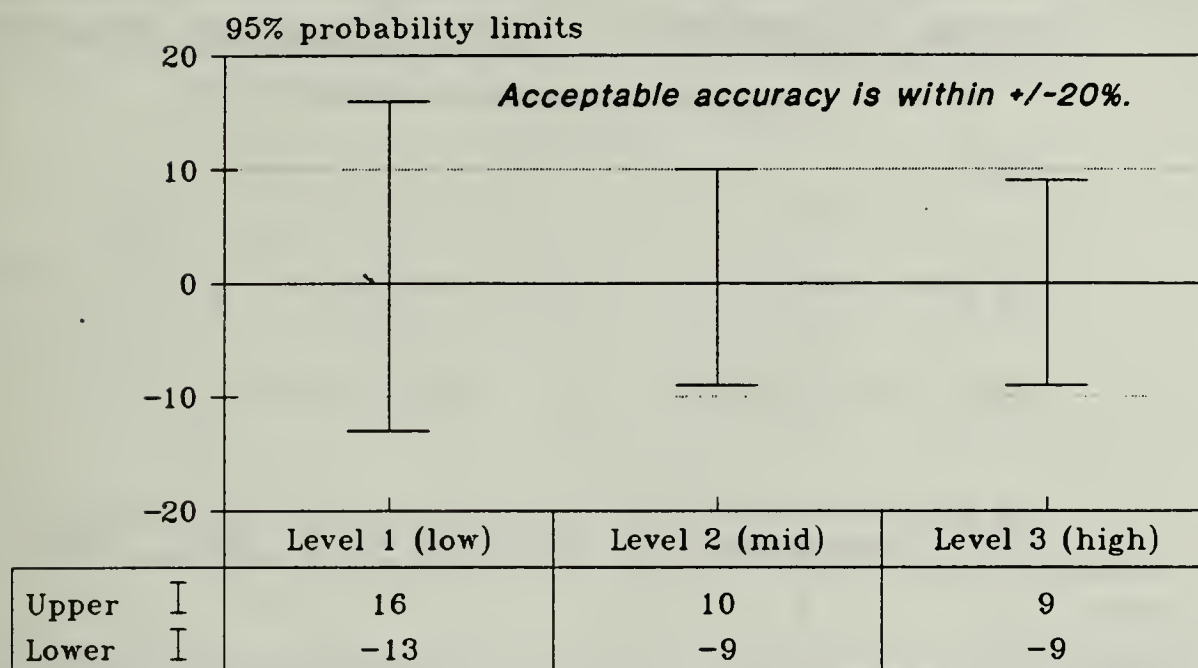


figure 31

1992 O3 Accuracy Summary

*Upper and lower 95%
probability limits*

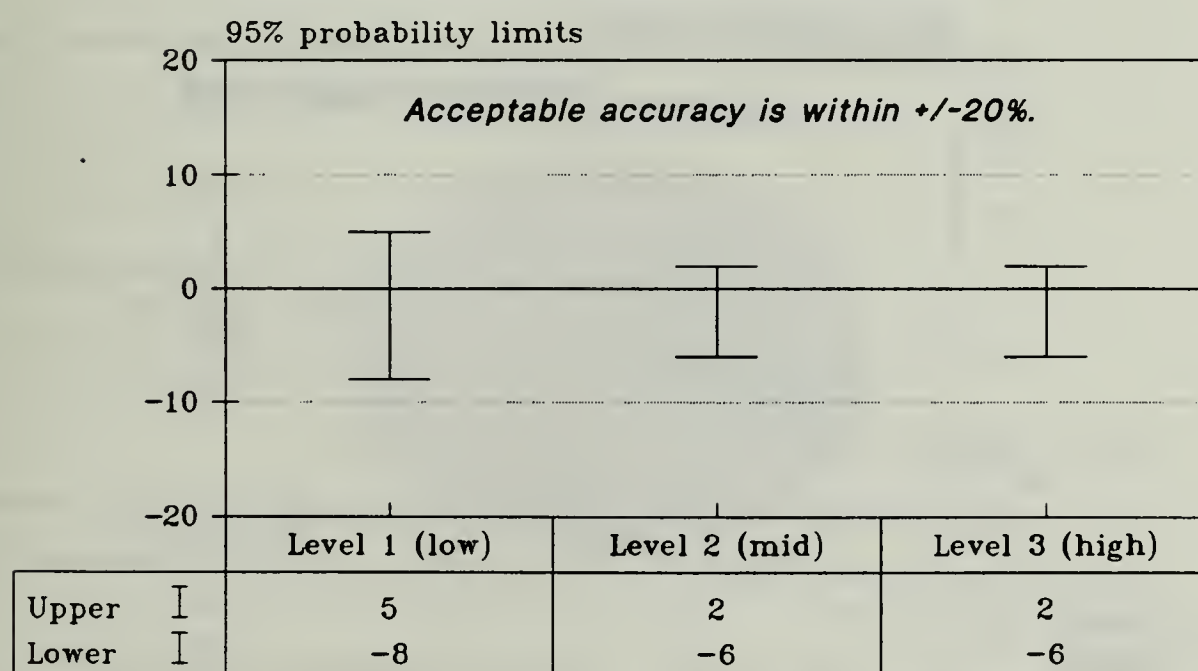


figure 32

1992 S02 Accuracy Summary

Upper and lower 95% probability limits

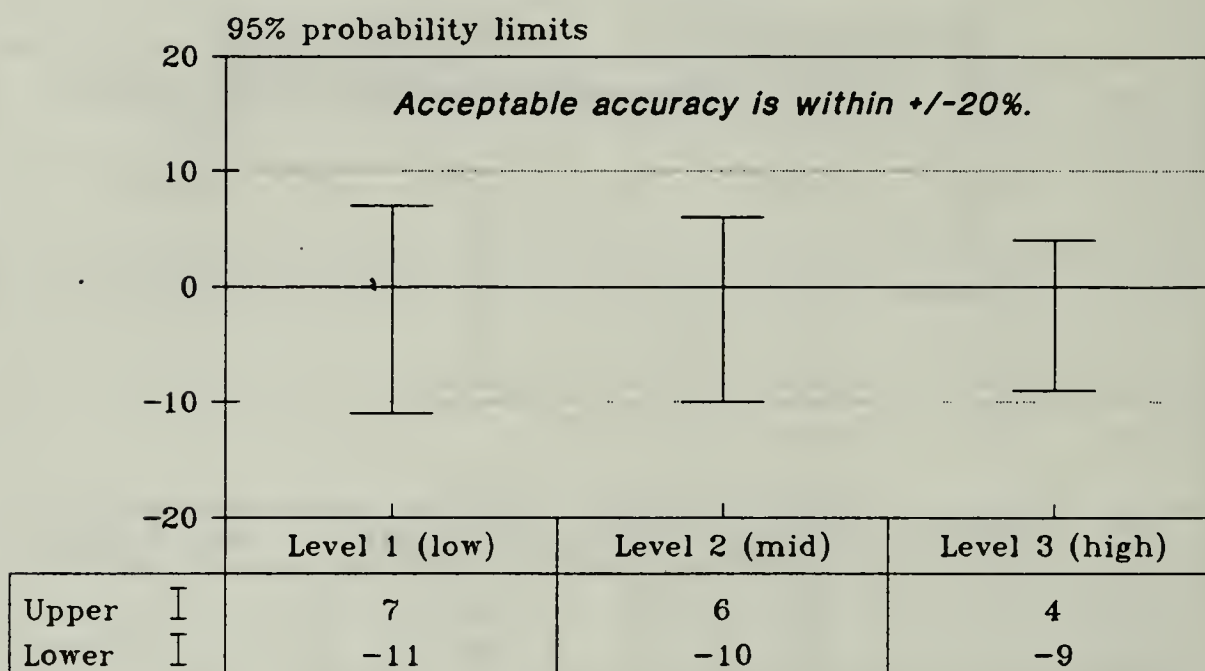


figure 33

PM10 + PB Accuracy Summary

Upper and lower 95% probability limits

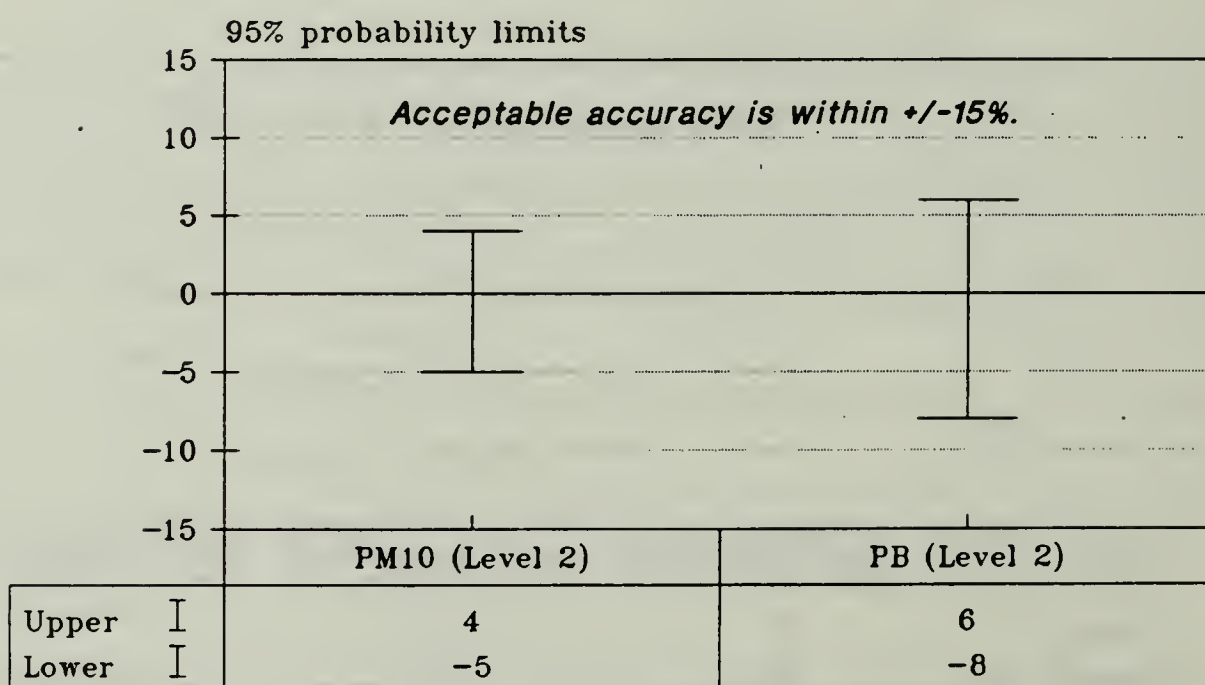


figure 34

3.10 DATA CAPTURE

Acceptable data capture for regulatory purposes requires that continuous monitors (O₃, SO₂, NO₂ and CO) collect 75% of the year's data. 40 out of 42 continuous monitors achieved this goal. The requirement for noncontinuous monitors (PM₁₀ and Pb) is 75% data capture for each

calendar quarter. 7 out of 21 monitors achieved this goal. The data loss was due both to a lab error and the temporary cessation of monitoring at sites while roof repair work was performed. The following Figures show the combined data capture for each parameter.

O₃ Data Capture *All sites during Ozone Season (April through October)*

14 out of 16 ozone monitors met the 75% yearly data capture requirement.

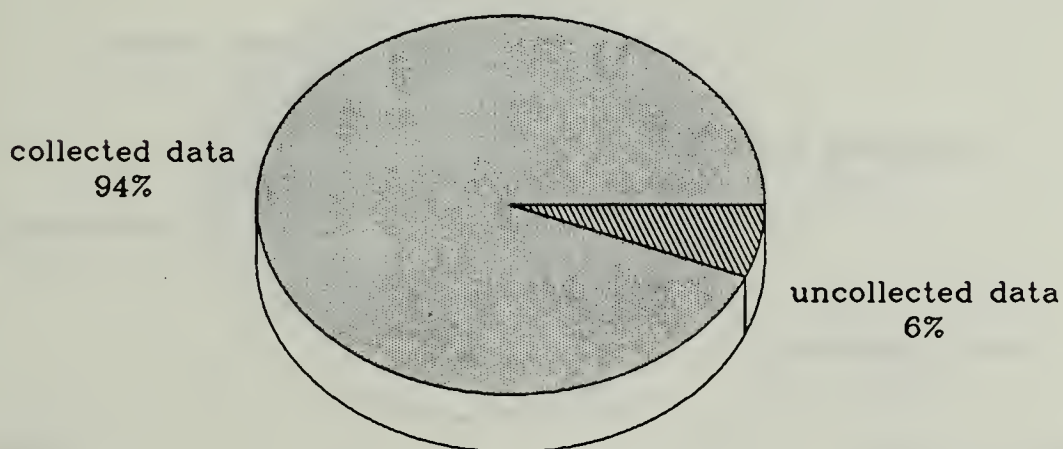


figure 35

S02 Data Capture *For all sites during 1992*

11 out of 11 SO2 monitors met the 75% yearly data capture requirement.

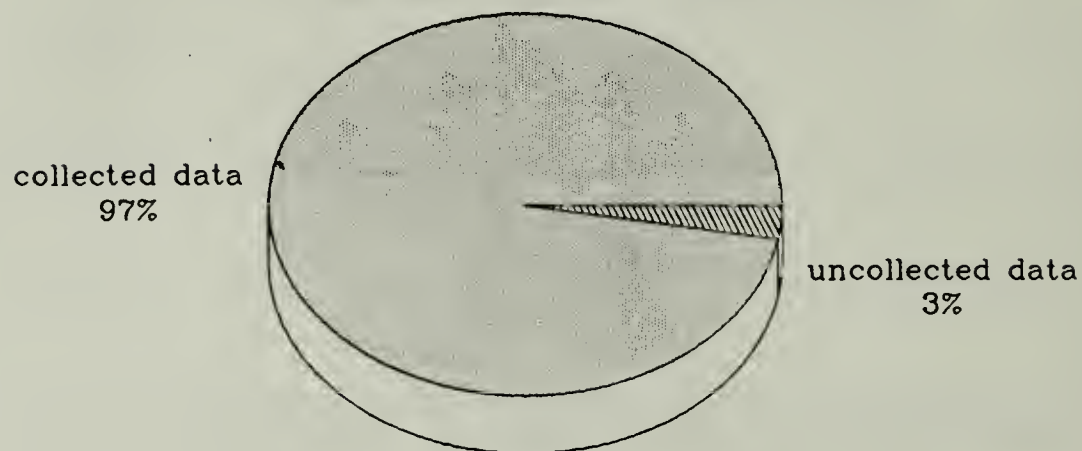


figure 36

NO2 Data Capture *For all sites during 1992*

6 out of 6 NO2 monitors met the 75% yearly data capture requirement.

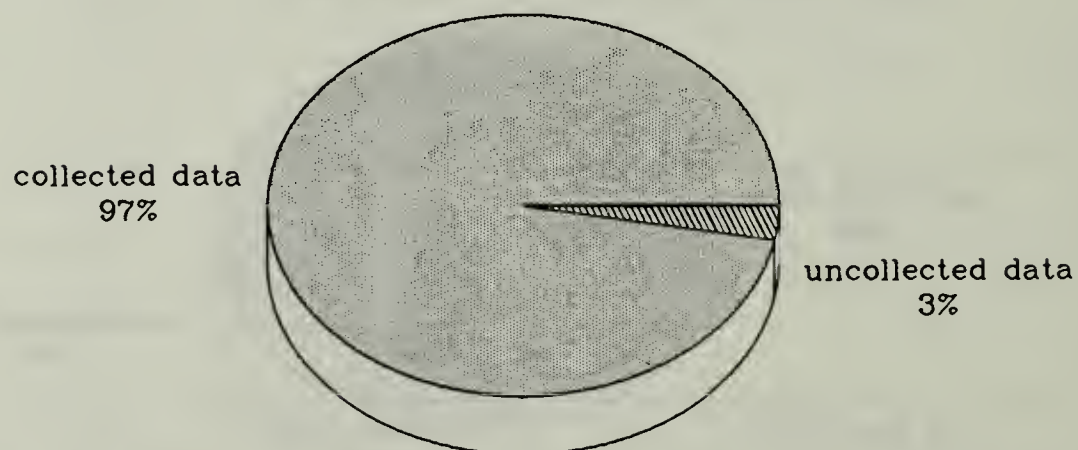


figure 37

CO Data Capture *For all sites during 1992*

9 out of 9 CO monitors met the 75% yearly data capture requirement.

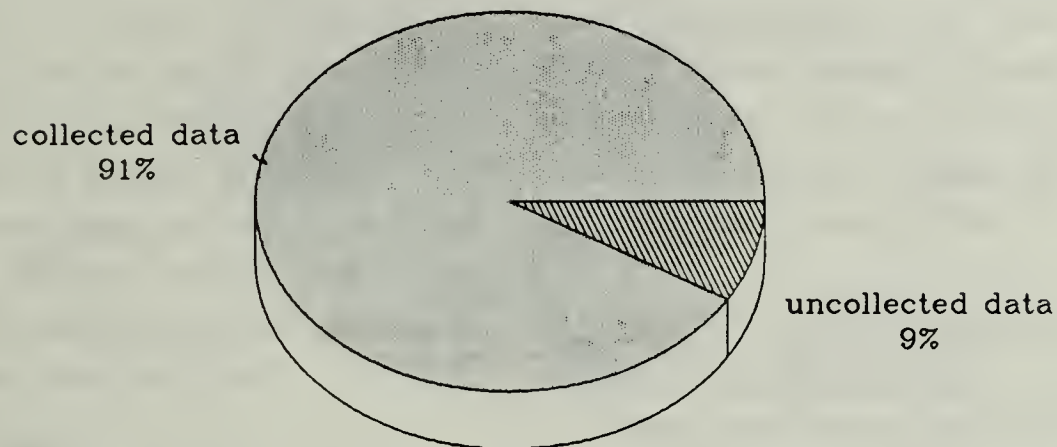


figure 38

PM10 Data Capture *For all sites during 1992*

4 out of 17 PM10 monitors met the requirement of 75% data capture for each calendar quarter. The data loss was due to roof repairs which made sites inaccessible and a lab error.

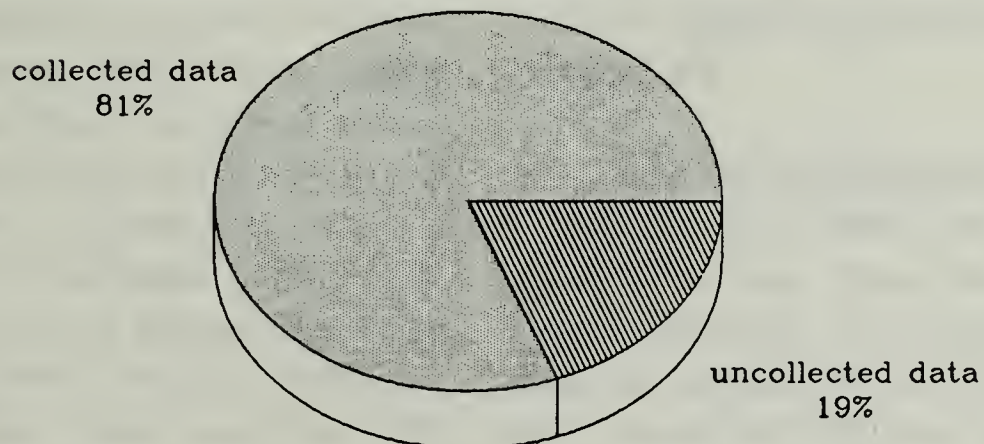


figure 39

Pb Data Capture

For all sites during 1992

3 out of 4 Pb monitors met the requirement of 75% data capture for each calendar quarter.

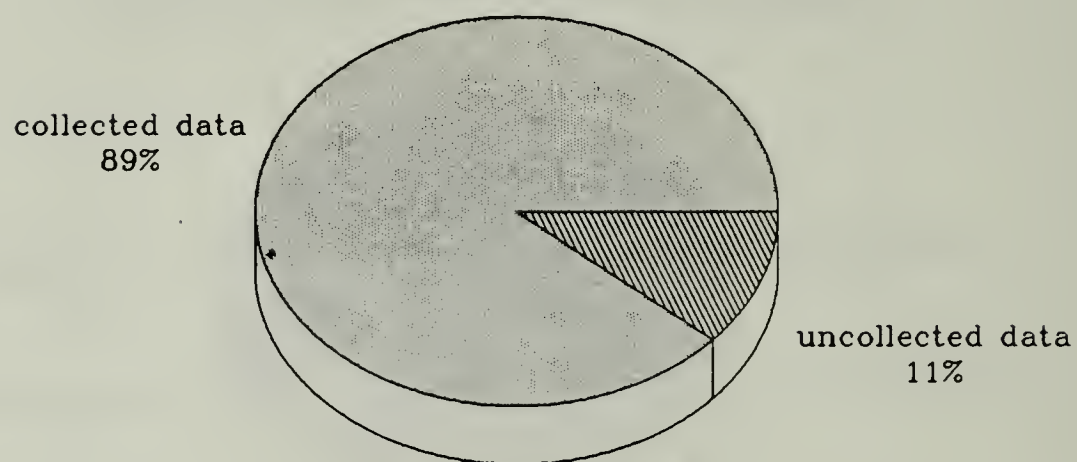


figure 40

4. AMBIENT AIR QUALITY DATA - INDUSTRIAL NETWORK

4.1 INTRODUCTION

The industrial ambient air quality network is comprised of monitoring stations operated by industries with facilities that potentially may emit large amounts of criteria pollutants. An example would be a coal burning power plant which would produce SO₂. The monitoring stations in the industrial network are sited to measure the maximum values from the specific point source. For a power plant, when the pollutant (SO₂) value reaches certain trigger values the power plant switches to a lower sulfur content fuel. Because of the different siting criteria the measured values for the industrial stations may be higher than for the public stations.

The data from the industrial network is submitted to the Air Quality Surveillance Branch (AQSB). After it has gone through the quality assurance process the data is submitted into the Aerometric Information Retrieval System (AIRS).

4.2 SULFUR DIOXIDE (SO₂) DATA SUMMARY

There were twenty SO₂ sites during 1992 in the industrial network. The Northeast Utilities site located in Hadley (Summit House) was shut down in February, 1992. All of the remaining sites achieved 75% or greater data capture for the year. There were no violations of the SO₂ air quality standards during the year. The highest annual arithmetic mean was 0.012 ppm at the Boston Edison site in Boston (Atlantic Ave.) which is 40% of the standard. The highest 24-hour value was 0.058 ppm at the New England Power Co. site located in Fall River which is 41% of the standard. The highest 3-hour value was 0.202 ppm at the New England Power Co. site in Swansea which is 40% of the standard. Table 21 lists by site the SO₂ summary data for 1992.

4.3 NITROGEN DIOXIDE (NO₂) DATA SUMMARY

There were four NO₂ sites during 1992 in the industrial network. All of the sites achieved 75% or greater data capture. There were no violations of the NO₂ air quality standard during the year. The highest annual arithmetic mean was 0.023 ppm at the Medical Area Total Energy Project (MATEP) sites located in Brookline (Rte. 9) and Boston (Longwood Ave., Brookline Ave.) which is 46% of the standard. Table 22 lists by site the NO₂ summary data for 1992.

4.4 TOTAL SUSPENDED PARTICULATE (TSP) DATA SUMMARY

There were twelve TSP sites during 1992 in the industrial network. Three sites operated by the Pioneer Valley TSP Group located in Springfield (Rose St., Longhill St.) and Northampton were shut down during 1992. All of the remaining sites achieved 75% or greater data capture. TSP is no longer a criteria pollutant (it was replaced by PM₁₀ in 1987) so there are no standards for it. The highest 24-hour value was 138 µg/m³ at the Wellesley site which is 92% of the old standard. The highest annual arithmetic mean was 54 µg/m³ at the Boston Edison site in Boston (Atlantic Ave.) which is 72% of the old standard. Table 23 lists by site the TSP summary data for 1992.

4.5 SULFATE (SO₄) DATA SUMMARY

There were eight SO₄ sites during 1992 in the industrial network. Three sites operated by the Pioneer Valley TSP Group located in Springfield (Rose St., Longhill St.) and Northampton were shut down during 1992. All of the remaining sites achieved 75% or greater data capture. There are no standards for SO₄ since it is not a criteria pollutant. The highest 24-hour value was 49.0 µg/m³ at the Boston Edison sites in Boston

(Atlantic Ave., Breman St.). The highest annual arithmetic mean value was 10.62 $\mu\text{g}/\text{m}^3$ at the

Boston Edison site in Boston (Atlantic Ave.). **Table 24** lists by site the SO_4 data summary for 1992.

TABLE 21: 1992 INDUSTRIAL NETWORK SO_2 DATA SUMMARY

SULFUR DIOXIDE (42401)					MASSACHUSETTS		UNITS: 001 UG/CU METER (25 C)								
SITE ID	P	C T CITY	COUNTY	ADDRESS	REP ORG	#OBS	MAX 24-HR 1ST	MAX 24-HR 2ND	OBS	MAX 3-HR 1ST	OBS	MAX 1-HR 1ST	MAX 1-HR 2ND	AR ME	
	O M								> 365		> 1300				
25-005-0010	1 4	FALL RIVER	BRISTOL CO	BETWEEN GLOBE AND	017	8740	.058	.058	0	.136	.106	0	.217	.188	.
25-005-6001	1 4	SWANSEA	BRISTOL CO	SHARPS LOT ROAD	017	8717	.047	.035	0	.202	.092	0	.415	.241	.
25-009-1004	1 4	PEABODY	ESSEX CO	HILLTOP AT END OF	026	8657	.030	.028	0	.059	.058	0	.109	.090	.
25-009-1005	1 4	PEABODY	ESSEX CO	PERKINS STREET PL	026	7961	.037	.036	0	.131	.096	0	.228	.178	.
25-009-2003	1 4	LYNN	ESSEX CO	436 LYNNWAY	010	8687	.018	.015	0	.056	.042	0	.075	.067	.
25-009-3003	1 4	MARBLEHEAD	ESSEX CO	WATER TOWER, GREE	017	8714	.040	.039	0	.106	.082	0	.159	.132	.
25-009-5004	1 4	HAVERHILL	ESSEX CO	NETTLE SCHOOL, BO	002	8572	.030	.025	0	.056	.045	0	.070	.062	.
25-013-1005	1 4	HOLYOKE	HAMPDEN CO	MOUNT TOM POWER P	900	7840	.027	.023	0	.058	.054	0	.090	.089	.
25-013-1009	2 4	SPRINGFIELD	HAMPDEN CO	LONGHILL STREET S	900	8071	.039	.031	0	.064	.064	0	.073	.072	.
25-013-1010	1 4	SPRINGFIELD	HAMPDEN CO	CAREW STREET SUBS	900	8012	.047	.039	0	.072	.070	0	.095	.078	.
25-013-5002	1 4	WEST SPRINGFIE	HAMPDEN CO	W. SPRINGFIELD PO	900	8090	.041	.031	0	.066	.062	0	.081	.079	.
25-015-1002	1 4	HADLEY	HAMPSHIRE CO	SUMMIT HOUSE, MOU	900	798	.036	.027	0	.102	.052	0	.204	.088	.
25-015-2001	1 4	HADLEY	HAMPSHIRE CO	HOPKINS ACADEMY,	900	7788	.033	.027	0	.080	.063	0	.100	.093	.
25-015-3002	1 4	SOUTH HADLEY	HAMPSHIRE CO	PINE STREET SUBST	900	7701	.028	.027	0	.073	.066	0	.154	.141	.
25-017-1701	1 4	STONEHAM	MIDDLESEX CO	HILL STREET	025	8702	.040	.035	0	.070	.061	0	.075	.073	.
25-021-5001	1 4	WELLESLEY	NORFOLK CO	WELLESLEY COLLEGE	032	8287	.032	.031	0	.073	.060	0	.083	.082	.
25-025-0018	1 4	BOSTON	SUFFOLK CO	476 ATLANTIC AVEN	005	6739	.046	.044	0	.076	.067	0	.088	.086	.
25-025-0019	1 4	BOSTON	SUFFOLK CO	LONG ISLAND, BOST	005	8308	.030	.029	0	.054	.053	0	.072	.072	.
25-025-0020	1 4	BOSTON	SUFFOLK CO	DEWAR STREET, DOR	005	8278	.057	.046	0	.081	.071	0	.086	.084	.
25-025-0021	2 4	BOSTON	SUFFOLK CO	340 BREMAN STREET	005	8341	.047	.044	0	.079	.074	0	.088	.087	.
? INDICATES THAT THE MEAN DOES NOT SATISFY SUMMARY CRITERIA															

? INDICATES THAT THE MEAN DOES NOT SATISFY SUMMARY CRITERIA

PRIMARY STANDARDS: ANNUAL ARITHMETIC MEAN = 0.03 PPM

24-HOUR = 0.14 PPM

SECONDARY STANDARD: 3-HOUR = 0.50 PPM

TO CONVERT UNITS FROM PPM TO $\mu\text{G}/\text{M}^3$ MULTIPLY PPM x 2620

ABBREVIATIONS AND SYMBOLS USED IN TABLE 21

SITE ID = AIRS SITE IDENTIFICATION NUMBER POC = PARAMETER OCCURENCE CODE (DIFFERENTIATES BETWEEN MONITORS AT A SITE)

MT = MONITOR TYPE (4 = INDUSTRIAL) REP ORG = REPORTING ORGANIZATION #OBS = NUMBER OF HOUR OBSERVATIONS

MAX 24-HR, MAX 3-HR, MAX 1-HR 1ST 2ND = FIRST AND SECOND HIGHEST VALUE FOR TIME PERIOD INDICATED OBS > .14 = NUMBER OF 24-HR

AVG. GREATER THAN 0.14 PPM (24-HR STANDARD) OBS > .50 = NUMBER OF 3-HR AVG. GREATER THAN 0.50 PPM (3-HR

STANDARD) ARIT MEAN = ARITHMETIC MEAN (STANDARD = 0.030 PPM)

TABLE 22: 1992 INDUSTRIAL NETWORK NO_2 DATA SUMMARY

NITROGEN DIOXIDE (42602)				MASSACHUSETTS		UNITS: 007 PPM					
SITE ID	P	C T CITY	COUNTY	ADDRESS	REP ORG	#OBS	MAX	1-HR	MAX	24-HR	ARIT MEAN
	O M						1ST	2ND	1ST	2ND	
25-021-0008	1 4	BROOKLINE	NORFOLK CO	FISHER RESERVOIR, FISHER A	030	8223	.073	.069			.018
25-021-0009	1 4	BROOKLINE	NORFOLK CO	RTE 9 AND CHESTNUT HILL AV	030	8621	.107	.096			.023
25-025-0035	1 4	BOSTON	SUFFOLK CO	300 LONGWOOD AVE CHILDRENS	030	8633	.105	.102			.023
25-025-0036	1 4	BOSTON	SUFFOLK CO	SW CORNER OF BROOKLINE AVE	030	8624	.108	.102			.023

PRIMARY STANDARD: ANNUAL ARITHMETIC MEAN = 0.05 PPM

TO CONVERT UNITS FROM PPM TO $\mu\text{G}/\text{M}^3$ MULTIPLY PPM x 188

ABBREVIATIONS AND SYMBOLS USED IN TABLE 22

SITE ID = AIRS SITE IDENTIFICATION NUMBER POC = PARAMETER OCCURENCE CODE (DIFFERENTIATES BETWEEN MONITORS AT A SITE)

MT = MONITOR TYPE (4 = INDUSTRIAL) REP ORG = REPORTING ORGANIZATION #OBS = NUMBER OF HOUR OBSERVATIONS

MAX 1-HR 1ST 2ND = FIRST AND SECOND HIGHEST VALUE FOR TIME PERIOD INDICATED ARIT MEAN = ARITHMETIC MEAN (STANDARD = 0.05 PPM)

TABLE 23: 1992 INDUSTRIAL NETWORK TSP DATA SUMMARY

SUSPENDED PARTICULATE (11101)			MASSACHUSETTS		UNITS: 001 UG/CU METER (25 C)							
P	O M				REP	--MAXIMUM 24-HR VALUES--				ARITH	GEO	GEO
C T CITY	COUNTY	ADDRESS	ORG	#OBS	1ST	2ND	3RD	4TH	MEAN	MEAN	STD	
5001 1 4	SWANSEA	BRISTOL CO	SHARPS LOT ROAD	017	56	121	58	52	48	24	21	1.7
2003 1 4	LYNN	ESSEX CO	436 LYNNWAY	010	59	124	114	96	83	44	38	1.7
3003 1 4	MARBLEHEAD	ESSEX CO	WATER TOWER, GREEN STREET	017	61	82	74	50	47	27	25	1.5
0006 1 4	CHICOPEE	HAMPDEN CO	CORNER OF GRATTAN AND MEAD	000	61	137	126	120	106	48	42	1.7
0006 2 4	CHICOPEE	HAMPDEN CO	CORNER OF GRATTAN AND MEAD	031	29	121	76	69	59	42?	37?	1.7
0013 1 4	SPRINGFIELD	HAMPDEN CO	ROSE STREET	031	32	126	114	96	93	59?	53?	1.6
1009 1 4	SPRINGFIELD	HAMPDEN CO	LONGHILL STREET SUBSTATION	031	32	138	97	70	67	46?	42?	1.5
0003 1 4	NORTHAMPTON	HAMPSHIRE CO	ZISKIND HALL, SMITH COLLEGE	031	32	113	57	55	55	38?	35?	1.6
5001 1 4	WELLESLEY	NORFOLK CO	WELLESLEY COLLEGE	032	56	100	93	85	78	36	32	1.6
0018 1 4	BOSTON	SUFFOLK CO	476 ATLANTIC AVENUE	005	47	131	106	102	85	54?	51?	1.5
0018 2 4	BOSTON	SUFFOLK CO	476 ATLANTIC AVENUE	005	47	129	106	94	90	54?	50?	1.4
0019 1 4	BOSTON	SUFFOLK CO	LONG ISLAND, BOSTON HARBOR	005	60	62	61	60	53	27	24	1.6
0020 1 4	BOSTON	SUFFOLK CO	DEWAR STREET, DORCHESTER	005	60	110	83	78	76	39	36	1.5
0021 2 4	BOSTON	SUFFOLK CO	340 BREMAN STREET, EAST BOS	005	61	100	100	76	74	43	39	1.5
ATES THAT THE MEAN DOES NOT SATISFY SUMMARY CRITERIA												

ATES THAT THE MEAN DOES NOT SATISFY SUMMARY CRITERIA

ABBREVIATIONS AND SYMBOLS USED IN TABLE 23

SITE ID = AIRS SITE IDENTIFICATION NUMBER POC = PARAMETER OCCURRENCE CODE (DIFFERENTIATES BETWEEN MONITORS AT A SITE)

MT = MONITOR TYPE (4 = INDUSTRIAL) REP ORG = REPORTING ORGANIZATION # OBS = NUMBER OF OBSERVATIONS

MAXIMUM VALUES 1ST,2ND,3RD,4TH = 1ST,2ND,3RD AND 4TH HIGHEST 24-HOUR VALUES FOR THE YEAR ARITH MEAN = ARITHMETIC MEAN

GEO MEAN = GEOMETRIC MEAN GEO STD = GEOMETRIC STANDARD DEVIATION

TABLE 24: 1992 INDUSTRIAL NETWORK SO4 DATA SUMMARY

SULFATE (TSP) (12403)						MASSACHUSETTS						
P	O	M				REP			MAXIMUM VALUES			ARITH
D	C	T	CITY	COUNTY	ADDRESS	ORG	#OBS	1ST	2ND	3RD	4TH	MEAN
0006	1	4	CHICOPEE	HAMPDEN CO	CORNER OF GRATTAN	031	61	39.8	16.0	15.3	14.0	7.49
0006	2	4	CHICOPEE	HAMPDEN CO	CORNER OF GRATTAN	031	29	42.0	11.3	11.0	10.6	8.18?
0013	1	4	SPRINGFIELD	HAMPDEN CO	ROSE STREET	031	32	11.4	10.2	10.0	9.5	6.15?
1009	1	4	SPRINGFIELD	HAMPDEN CO	LONGHILL STREET SUB	031	32	14.0	13.0	11.0	10.6	6.84?
0003	1	4	NORTHAMPTON	HAMPSHIRE CO	ZISKIND HALL, SMITH	031	32	12.0	9.3	9.1	8.9	5.15?
0018	1	4	BOSTON	SUFFOLK CO	476 ATLANTIC AVENUE	005	47	49.0	18.0	16.0	16.0	10.62?
0018	2	4	BOSTON	SUFFOLK CO	476 ATLANTIC AVENUE	005	47	49.0	18.0	16.0	15.0	10.62?
0019	1	4	BOSTON	SUFFOLK CO	LONG ISLAND, BOSTON	005	60	44.0	27.0	17.0	16.0	9.22
0020	1	4	BOSTON	SUFFOLK CO	DEWAR STREET, DORCH	005	60	45.0	18.0	17.0	17.0	10.23
0021	2	4	BOSTON	SUFFOLK CO	340 BREMAN STREET,	005	61	49.0	17.0	16.0	16.0	10.05

ATES THAT THE MEAN DOES NOT SATISFY SUMMARY CRITERIA

ABBREVIATIONS AND SYMBOLS USED IN TABLE 24

SITE ID = AIRS SITE IDENTIFICATION NUMBER POC = PARAMETER OCCURRENCE CODE (DIFFERENTIATES BETWEEN MONITORS AT A SITE)

MT = MONITOR TYPE (4 = INDUSTRIAL) REP ORG = REPORTING ORGANIZATION # OBS = NUMBER OF OBSERVATIONS

MAXIMUM VALUES 1ST,2ND,3RD,4TH = 1ST,2ND,3RD AND 4TH HIGHEST 24-HOUR VALUES FOR THE YEAR ARITH MEAN = ARITHMETIC MEAN

SECTION 2

SPECIAL STUDIES MONITORING

1. OZONE AND COMPLIANCE SECTION

1.1 OVERVIEW

The Ozone and Compliance Section (OCS) of the Air Quality Surveillance Branch (AQSB) is charged with developing strategy and procedures for compliance with the 1990 Clean Air Act Enhanced Ozone ambient air monitoring requirements, and for monitoring toxic air pollutants under long term and short term special site specific study situations.

Clean Air Act ambient air monitoring regulations have recently been promulgated which prescribe an ambitious overall increase in intensity and sophistication of DEP ambient air monitoring activities. This will require the automation of technology which has been employed previously for trace monitoring of air toxics in the ambient air. In addition to the challenges associated with enhanced ozone monitoring, the Air Quality Surveillance Branch continues to provide the Department with site specific special air monitoring services, and reviews and makes recommendations about mandated ambient air toxics monitoring projects conducted by private consultants.

1.2 ENHANCED OZONE PROGRAM **1992 Enhanced Ozone Pilot Program**

Since 1991, the Massachusetts DEP has initiated activities to develop capabilities for future compliance with enhanced ozone monitoring provisions of the 1990 Clean Air Act. Associated regulations are contained in revision to Federal Register 40 CFR Part 58 as revised February 12, 1993. The new enhanced ozone

ambient monitoring program includes the intensive measurement of meteorological parameters in addition to criteria (ozone and oxides of nitrogen) and non-criteria air pollutants (volatile organic compounds [VOCs] including hydrocarbons and carbonyls), which contribute to the formation of high concentrations of ground level ozone.

Massachusetts contains two serious nonattainment regions for ozone (Boston and Springfield Areas). This requires Massachusetts to construct an ambient enhanced ozone monitoring network around each of the two cities over the next five years. This network begins with the location of monitoring stations immediately downwind of the center of ozone forming pollutant emissions for each city in 1993. Additional sites will be phased in, for a total of five in Boston Area and three in the Springfield Area by 1997.

Based on the successful pilot study in 1991, a site on the grounds of the City of Lynn Water Treatment Plant was selected for Boston's 1993 downwind intensive (designated as "Type 2" location) Enhanced Ozone Monitoring station. This site was installed and made partially operational during 1992.

During the summer (July to September) of 1992, the AQSB conducted an ozone precursor ambient Non-Methane Organic Carbon (NMOC) air monitoring program in the Springfield area to

select a "Type 2" monitoring station in preparation for the 1993 mandated monitoring efforts.

Samples were taken and analyzed by a contractor for ozone and VOCs at four remote site locations in the Springfield Area over twenty four, three hour, sampling events. One upwind site (Agawam) and three presumed downwind of Springfield locations (Chicopee, South Hadley and Ludlow) were used during the study. Based on the results, the existing DEP monitoring station at Westover Air Force Base in Chicopee was selected as the 1993 intensive enhanced ozone monitoring site.

PAMS Program in Lynn monitoring site

Five states (Connecticut, Illinois, Massachusetts, New York and Texas) participated in the USEPA's 1992 "Photochemical Assessment Monitoring Stations (PAMS) "special study". The Lynn monitoring station was picked as the Massachusetts PAMS site and has been in operation for this program since July, 1992.

Twenty four hour time weighted aldehyde cartridge and a canister VOC samples (collected using a SUMMA polished, six liter stainless steel canister) have been taken according to the every sixth day NAMS total suspended particulate program schedule since July, 1992. This schedule was modified to every twelve days during the winter. The aldehyde and canister samples are shipped to an EPA contractor (Radian Corporation) for the Carbonyl (ie. aldehydes) and Speciated VOC's (ie. hydrocarbons including benzene, toluene and xylenes) analysis. This special program will be terminated June 1, 1993.

1.3 SPECIAL STUDIES

The AQSB (OCS) conducted a number of short and long term site specific special studies during 1992. One day contaminated site associated studies were conducted at locations in Greenfield, Rockport, Springfield, Weymouth, Peabody and Roslindale for the DEP Bureau of Waste Site Clean Up. Most of these studies evaluated the impacts to indoor locations from underground VOC emissions from nearby contaminated sites.

Other longer term ambient (outdoor) air monitoring studies were performed in 1992 in the vicinities of potential emission sources located in Andover, Billerica, Tewksbury and Watertown.

Most studies of both types involved the measurement of volatile organic compounds. Although the DEP's dedicated air toxics analytical system was down during the entire 1992, many special study samples were analyzed using the newly acquired Chrompack automated gas chromatograph. This instrument is being reconfigured to measure ambient ozone precursor VOCs on an hourly basis at the new Lynn site commencing June 1, 1993.

1993 plans include the full implementation of enhanced ozone monitoring including automated gas chromatograph VOC monitoring and 3 hour carbonyl (aldehydes) sampling at the two designated enhanced ozone monitoring sites (Lynn and Chicopee). Several ambient special studies are planned, utilizing newly upgraded air toxics analytical capabilities.

APPENDIX A: PUBLIC SITE CROSS REFERENCE

PUBLIC SITE CROSS REFERENCE: AIRS #, SAROAD #, UTM COORDINATE

CITY SITE NAME	AIRS # (SAROAD #)	UTM ZONE	UTM EAST	UTM NORTH
<u>ADAMS</u> Mt. Greylock	25-003-4002 (22-0020-002)	18	650160	4721890
<u>AGAWAM</u> Agawam	25-013-0003 (22-0030-003)	18	692120	4659040
<u>AMHERST</u> Amherst	25-015-0103 (22-0060-003)	18	703800	4696975
<u>BOSTON</u> Kenmore Square	25-025-0002 (22-0240-002)	19	327095	4690373
<u>BOSTON</u> South Bay	25-025-0012 (22-0240-012)	19	329584	4688213
<u>BOSTON</u> Sumner Tunnel	25-025-0016 (22-0240-021)	19	332000	4692500
<u>BOSTON</u> East Boston (Bremen St.)	25-025-0021 (22-0240-021)	19	333008	4693531
<u>BOSTON</u> Columbus Ave.	25-025-0024 (22-0240-024)	19	329406	4690316
<u>BOSTON</u> Charlestown	25-025-0027 (22-0240-027)	19	330090	4693015
<u>BOSTON</u> Post Office Sq.	25-025-0038 (22-0240-038)	19	330840	4691500
<u>CHELSEA</u> Soldiers Home	25-025-1003 (22-0380-003)	19	332910	4696126
<u>CHICOPEE</u> Westover AFB	25-013-0008 (22-0400-008)	18	701792	4674012
<u>EASTON, NORTH</u> Post Office	25-005-1001 (22-0530-001)	19	327039	4659141
<u>FAIRHAVEN</u> Wood School	25-005-1002 (22-0570-002)	19	343300	4610800
<u>FALL RIVER</u> Fire Headquarters (Bedford St.)	25-005-3001 (22-0580-001)	19	320961	4618523
<u>FALL RIVER</u> Globe Street	25-005-1004 (22-0580-004)	19	319694	4616888

PUBLIC SITE CROSS REFERENCE: AIRS #, SAROAD #, UTM COORDINATE

CITY SITE NAME	AIRS # (SAROAD #)	UTM ZONE	UTM EAST	UTM NORTH
<u>LAWRENCE</u> Storrow Park	25-009-0005 (22-1000-005)	19	324221	4730569
<u>LOWELL</u> Old City Hall	25-017-0007 (22-1080-007)	19	310489	4723770
<u>MEDFORD</u> Fire Headquarters	25-017-3002 (22-1220-002)	19	326300	4697990
<u>NEW BEDFORD</u> YMCA	25-005-2004 (22-1500-003)	19	339500	4610110
<u>NEWBURYPORT</u> National Wildlife Headquarters	25-009-4003 (22-1520-003)	19	351293	4741568
<u>QUINCY</u> Fire Station	25-021-0007 (22-1880-007)	19	332391	4682065
<u>SCITUATE</u> Police Station	25-023-2001 (22-2020-001)	19	354000	4673000
<u>SPRINGFIELD</u> Howard School	25-013-0011 (22-2160-016)	18	699454	4663358
<u>SPRINGFIELD</u> Liberty Street	25-013-0016 (22-2160-016)	18	699140	4664480
<u>SPRINGFIELD</u> Longhill Ave.	25-013-1009 (22-2160-009)	18	700185	4661896
<u>SPRINGFIELD</u> East Columbus Ave.	25-013-2007 (22-2160-007)	18	699150	4663534
<u>SUDBURY</u> National Wildlife Refuge	25-017-1801 (22-2196-001)	19	303344	4695074
<u>TRURO</u> Cape Cod National Seashore	25-001-0002 (22-2275-001)	19	415800	4647500
<u>WALTHAM</u> U Mass Field Station	25-017-4003 (22-2340-001)	19	317750	4694520
<u>WARE</u> Quabbin Summit	25-015-4002 (22-2360-002)	18	719712	4686127
<u>WEST SPRINGFIELD</u> Fire Station	25-013-5003 (22-2475-003)	18	696403	4663920

PUBLIC SITE CROSS REFERENCE: AIRS #, SAROAD #, UTM COORDINATE

CITY SITE NAME	AIRS # (SAROAD #)	UTM ZONE	UTM EAST	UTM NORTH
<u>WORCESTER</u> U Mass Medical Center	25-027-0013 (22-2640-016)	19	272392	4683693
<u>WORCESTER</u> Airport	25-027-0015	19	262797	4684016
<u>WORCESTER</u> YWCA	25-027-0016 (22-2640-016)	19	269108	4682163
<u>WORCESTER</u> State DPW Yard	25-027-0019 (22-2640-019)	19	272335	4683779
<u>WORCESTER</u> Fire Station (Central St.)	25-027-0020 (22-2640-020)	19	269152	4683021
<u>WORCESTER</u> Franklin & Grafton St.	25-027-0022	19	269599	4682294

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APPENDIX B: INDUSTRIAL SITE CROSS REFERENCE

INDUSTRIAL SITE CROSS REFERENCE: AIRS #, SAROAD #, UTM COORDINATE

REPORTING ORGANIZATION CITY	AIRS # (SAROAD #)	UTM ZONE	UTM EAST	UTM NORTH
<u>ATLANTIC GELATIN</u> Stoneham	25-017-1701 (22-2180-001)	19	326462	4704385
<u>BOSTON EDISON</u> Boston (Atlantic Ave.)	25-025-0018 (22-0240-018)	19	413201	4689362
<u>BOSTON EDISON</u> Boston (Long Island)	25-025-0019 (22-0240-019)	19	337595	4686595
<u>BOSTON EDISON</u> Dorchester	25-025-0020 (22-0240-020)	19	330548	4685952
<u>BOSTON EDISON</u> East Boston (Breman St.)	25-025-0021 (22-0240-021)	19	333008	4693531
<u>EASTMAN GELATINE</u> Peabody (Meadow Pond)	25-009-1004 (22-1780-004)	19	341340	4708630
<u>EASTMAN GELATINE</u> Peabody (Fox Hill)	25-009-1005 (22-2780-005)	19	341130	4709640
<u>GENERAL ELECTRIC</u> Lynn	25-009-2003 (22-1100-003)	19	339171	4701463
<u>HAVERHILL PAPERBOARD</u> Haverhill	25-009-5004 (22-0840-002)	19	331385	4737365
<u>MATEP</u> Brookline (Fisher Hill)	25-021-0008 (22-0340-003)	19	324239	4688777
<u>MATEP</u> Brookline (Rte 9/Chestnut Hill Ave.)	25-021-0009 (22-0340-004)	19	324192	4686926
<u>MATEP</u> Boston (Children's Hospital)	25-025-0035 (22-0240-035)	19	326357	4689109
<u>MATEP</u> Boston (Deaconess Hospital)	25-025-0036 (22-0240-036)	19	326190	4689152
<u>MATEP</u> Boston (Mission Park)	25-025-0039 (22-0240-039)	19	332566	4692277
<u>NEW ENGLAND POWER CO.</u> Fall River	25-005-0010 (22-0580-010)	19	318960	4617230
<u>NEW ENGLAND POWER CO.</u> Swansea	25-005-6001 (22-2230-001)	19	317300	4624600

INDUSTRIAL SITE CROSS REFERENCE: AIRS #, SAROAD #, UTM COORDINATE

REPORTING ORGANIZATION CITY	AIRS # (SAROAD #)	UTM ZONE	UTM EAST	UTM NORTH
<u>NEW ENGLAND POWER CO.</u> Salem	25-009-2004 (22-1980-004)	19	345900	4710100
<u>NEW ENGLAND POWER CO.</u> Marblehead	25-009-3003 (22-1160-003)	19	347395	4707922
<u>NORTHEAST UTILITIES</u> Holyoke	25-013-1005 (22-0860-005)	18	697554	4683012
<u>NORTHEAST UTILITIES</u> Springfield (Longhill Ave.)	25-013-1009 (22-2160-009)	18	700185	4661896
<u>NORTHEAST UTILITIES</u> Springfield (Carew St.)	25-013-1010 (22-2160-010)	18	699855	4666415
<u>NORTHEAST UTILITIES</u> West Springfield	25-013-5002 (22-2475-002)	18	698639	4662867
<u>NORTHEAST UTILITIES</u> Hadley (Summit House)	25-015-1002 (22-0789-002)	18	699160	4685971
<u>NORTHEAST UTILITIES</u> Hadley (Hopkins Academy)	25-015-2001 (22-0789-001)	18	693398	4690214
<u>NORTHEAST UTILITIES</u> South Hadley	25-015-3002 (22-2126-002)	18	699012	4679687
<u>PIONEER VALLEY TSP GROUP</u> Chicopee	25-013-0006 (22-1400-006)	18	697069	4672615
<u>PIONEER VALLEY TSP GROUP</u> Springfield (Rose/Page St.)	25-013-0013 (22-2160-013)	18	702346	4668346
<u>PIONEER VALLEY TSP GROUP</u> Springfield (Longhill Ave.)	25-013-1009 (22-2160-009)	18	700185	4661896
<u>PIONEER VALLEY TSP GROUP</u> Northampton	25-015-0003 (22-1600-003)	18	694700	4687800
<u>WELLESLEY COLLEGE</u> Wellesley	25-021-5001 (22-2420-001)	19	310150	4684780

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CHARLESTOWN, MASS

